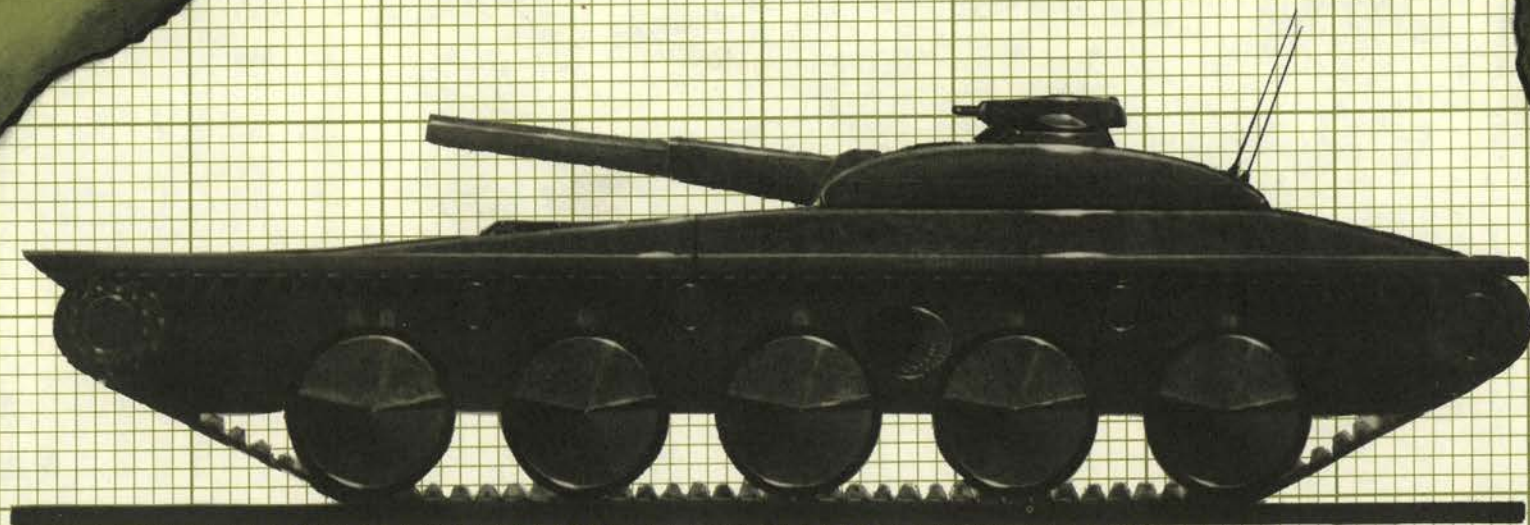


january-february 1975

ARMOR



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ARMOR

the Magazine of Mobile Warfare

Volume LXXXIV

January-February 1975

No. 1

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ON THE COVER . . .

A tank is a tank — a harmonious marriage of weapons technology, ballistic protection, suspension, power and human engineering. The complexity of design is generated by two important questions: *What is a particular tank concept expected to accomplish; and in what environment is it expected to survive?*

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LETTERS

"Tank Gunnery" Discussed

Dear Sir:

I found Lieutenant Colonel Bahnsen's article on Tank Gunnery extremely refreshing to say the least; here at last is someone who will tell it like it is, and back it up with facts and figures.

Here at Fort Carson we have redesigned Table VIII, constructed Table IX, and have plans for Table X. However, the age-old problem of time and resources continues to plague an efficient gunnery program for the tankers. This division is now balanced with five mechanized infantry battalions, four tank battalions and a cavalry squadron; to me this would indicate that, under reasonable circumstances, equitable time "down-range" for all concerned is available. Not so—we continually train our tankers under crash programs; block out six weeks for Tables IV through VIII, and IX if time permits; utilize only the warm weather for gunnery so as not to hassle the troops; and above all, condense everything so as to insure that they can still pull their fair share of the "ash and trash" details.

We are not fooling anyone with our methods except ourselves and those who read the DA Form 2715 report. Ask any tanker who has been through a gunnery program here if he considers himself "combat ready" and the answer will be the same. The crews have one thing in mind; get through the program as quickly as possible and "qualify"—this should not be the desired result of any training program, let alone tank gunnery.

In addition to the proposals outlined by Colonel Bahnsen, perhaps we should de-emphasize the ORTT requirement for the tank battalions and concentrate on gunnery coupled with live-fire company level ATTs. In my opinion, the battalion staff can gain the necessary expertise needed to operate efficiently through CPXs and FTXs, and there is no need to use valuable gunnery time practicing the attack, delay and defense at battalion level. If the tankers can't hit the target, then the best trained staff has wasted its time and that of the companies and platoons.

Awareness of new doctrines and methodology in tank gunnery training is sadly lacking somewhere in the hierarchy of today's Army. Realism,

innovation and efficient management of resources is totally lacking and an inordinate amount of time is spent in fulfilling requirements rather than insuring that our tankers are trained.

A voice in the wilderness, agreeing with Colonel Bahnsen, is not the answer; nor is what Colonel Bahnsen proposed a panacea. However, I agree wholeheartedly that the time has come to face the facts and start training—something that too many profess they are doing when in fact they are really just keeping the wolves away from the door. The virtues of *status quo* must not go on as being sacrosanct or untouchable!

JOHN K. WATERS JR.

Major, Armor

Fort Carson, Colorado 80906

Dear Sir:

Lieutenant Colonel Bahnsen's article, "Our Tank Gunnery Needs A Revival," (*ARMOR*, September-October 1974) certainly poses some excellent challenges; however, I am somewhat dubious about the hit probability of the 105mm APDS round using a 1,600 meter battlesight firing at a target, hopefully a large one, at 1,900 meters. It would appear that considering tube droop, powder temperature and other factors that affect hit probability, the gunner might be more inclined to aim at the top of the target at 1,900 meters, although I'm not sure how he determined this range without using his rangefinder, particularly if only the front of a T62 turret is exposed. The T62 turret is approximately 24 inches in height, and with the M392 round standard deviation, I'm not even certain of a second round hit on such a small target. Therefore, it appears under such conditions that I would aim high, ask sensing assistance from an adjacent tank and hope for the first round hit.

STANLEY R. WILSON
Major, USARNG

Cape Canaveral, Florida 32920

Dear Sir:

While I agree with Lieutenant Colonel Bahnsen that our tank gunnery training needs improvement, I think that he has mixed apples with oranges and come up with bananas. Tank gun-

nery should be considered in two aspects. Part one is "marksmanship" training to teach the gunner and the tank crew the fundamentals of gunnery and to teach them how to get the most accuracy from their tank. The other part is "combat" gunnery training that teaches a unit how to engage enemy units since we will hopefully never employ our tanks one at a time and the enemy certainly only employs his en masse.

Colonel Bahnsen's techniques of battlesight gunnery are guaranteed to produce more first round misses than hits. I've heard the statement that one who fires first usually wins, but I think this is a product of the days when BOT was feasible. To begin with it would be foolhardy to carry an APDS round in the chamber as the battlesight ammunition. HEAT is just as accurate as APDS at ranges up to 1,500 meters and is a more versatile round enabling one to engage soft targets such as RPG teams and missile firing vehicles as well as tanks.

Secondly, if less than a fully exposed tank is engaged, many rounds will pass over the target with a battlesight of 1,600 meters, even when aiming at the base of the target.

Lastly, this method requires the gunner to change his sighting technique and take a different aim than a standard engagement, complicating his task. It is difficult enough (if not impossible) to teach a gunner and to maintain proficiency in the various aim-offs required—the lead element for moving targets, aim-off when firing HEP and aim-off when firing from a canted position. Why complicate this further by another aim-off?

HALLET L. LA FOSSE

Lieutenant Colonel, Armor
Fort Knox, Kentucky 40121

Dear Sir:

Water truck drivers can now take a break and range monitors should cease being nervous (if such a condition is possible).

Congratulations to Lieutenant Colonel Bahnsen on his "Tank Gunnery" article which appeared in the *ARMOR* September-October issue. This is good, strong medicine for all of us, especially those who sometimes commit the unpardonable sin of trying to over-complicate warfare!

There are a couple of points I'd like to make with reference to this effort.

The APDS training round is mentioned. I believe credit should go to my ex-boss, Lieutenant General Bill Desobry, currently commanding general of V Corps, for getting the ball rolling on the M724 round. Assisted by Colonels Charlie Canedy and Carm Milia, General Desobry energized the system to look into this training round several years ago. We are all delighted that these efforts are now bearing some fruit.

I concur with the round in the chamber technique. Much training value can develop from this and of real importance, lives may be saved in the "next unpleasantness" since crews will be accustomed to the procedure they will use in combat anyway.

I also concur with the flare illumination (at least one exercise) for the night run. This adds realism and also acts to train mortar and/or artillery units.

The idea of Table IX is a good one. In 1950-51 the 63d Tank Battalion, 1st Infantry Division, commanded by Lieutenant Colonel Creighton W. Abrams, underwent this training which was the finest I personally have ever experienced in our branch. This range was the famous Range 8 Battle Run at Bergen Hohné Soltau, Federal Republic of Germany. Accordingly, the concept is not new. I was company commander the first year and range officer the second and can personally attest to the fact that coordinated, combat-ready tank crews were in fact made on this range. The exercise, as I recall, was a tank platoon attack using service ammunition over a course which was about 2½ to 3 miles in length. The final phase was to secure and defend the objective just taken. The important point relative to Range 8 was that the range officer retained sufficient flexibility in the target system so as to allow him to actually employ his targets in a way that would best challenge the scheme of maneuver of the attacking platoon. The targets were set with explosive charges. Please note, sir, the absence of the word "test" in the above. What was missing in this exercise and commented on frequently by our battalion commander was the absence of infantry and supporting fires as required. This could be, under Colonel Bahnsen's visualization, either Table X or XI depending upon how one fabricates the new gunnery tables.

What is needed as the ultimate is tank-infantry supporting fires — service ammunition exercises which really "stretch" the participating units. We were close to that in 1951 thanks to our

British comrades-in-arms. I fear that sometimes we tend to forget these things in training. Summarily, Range 8 as we called it in those days, was not only a superb training vehicle but also those troops enjoyed it. They had fun doing it. Units were built. Esprit was enhanced and combat readiness advanced by leaps and bounds.

I'll never forget Colonel Abrams going up to an old platoon sergeant (long since retired) whose name was "Daddy" Lucas. As old C34 rumbled back to the critique area sporting its 20th fan belt in 24 hours, Abe asked him, "Lucas, what did you get out of this exercise?" The answer was short but telling in its effect. "Sir, I have a crew and the Lieutenant has a platoon!" (As I recall, the lieutenant was Donn A. Starry, Major General, USA).

Again, congratulations to my pot-stirring friend, Colonel Bahnsen. He has gotten some people thinking.

G. S. PATTON

Major General, USA

South Hamilton, Massachusetts 01982

Dear Sir:

In response to Lieutenant Colonel Bahnsen's article, "Our Tank Gunnery Needs a Revival" in the September-October issue of *ARMOR*, I have one basic comment: Hear! Hear!

I know the history of the current tank gunnery qualification course. I was combat command commander in the 4th Armored Division, USAREUR, 1960-62 when General Bruce C. Clarke, inter alia, pushed the present concept into reality. I'm sure that General Clarke would agree that the original idea of simulated realism in tank gunnery has been prostituted by many people, pressures and circumstances over the past ten years. It is time for a major overhaul.

I note a relationship between Colonel Bahnsen's thesis and Major General Starry's concepts stated in "The Commander's Hatch" column in the same issue of *ARMOR*. Perhaps you might win General Starry's personal support to a basic revision of *FM 17-12*.

With repeated compliments on realistic professionalism and warm regards.

SAMUEL McC. GOODWIN

Brigadier General (USA-Retired)
Cerrillos, New Mexico 87010

A Salute to "0-52-0"

Dear Sir:

As a former tanker with A Troop, 4th Squadron, 12th Cavalry, 1st Brigade, 5th Infantry Division (Mechanized), I especially enjoyed Major James E. Smock's article "0-52-0" in the September-October issue of *ARMOR*.

Having served in the area around Quang Tri, the article brought back many memories. Like most soldiers, I am interested in the events that transpired in my former "area of operations" after I left.

It is indeed unfortunate that the 20th Tank Regiment suffered heavy losses. However, as Major Smock pointed out, this was not in vain.

I salute the officers and men of the 20th Tank Regiment who died, as well as those who continue to serve their nation. I also wish to thank both Major Smock, and *ARMOR* Magazine for presenting this fine article.

JAMES E. GOOD

ROTC Cadet

Manhattan, Kansas 66502

Recognition Training

Dear Sir:

As a long time member of the Armor Association, it is pleasing to note the recent increase in articles and letters to the editor in *ARMOR* dealing with contemporary problems in the areas of hardware, organization and tactics. This interest by Armor officers in their branch, and their willingness to stand up and be heard, is a commendable manifestation of professionalism.

It has been my observation that we tend all too rapidly to forget the lessons of experience and history in our development of equipment and tactics. Expressive articles by knowledgeable people on subjects such as the role of a scout, vehicles for a scout, the need for a commander's cupola, communications requirements, improvements in gunnery techniques, mine warfare and the optimum mix of ground and air cavalry elements tend to stimulate thinking and hopefully research, on these and similar subjects. Readers are motivated to express their own opinions, hopefully again in writing and in *ARMOR*. The result is an educational exchange of ideas beneficial to Armor Branch.

I would like to offer a suggestion dealing with the ever-present problem of vehicle recognition. When you print an article dealing with one or more armored vehicles currently in service, include at the end a block containing silhouette views and distinctive recognition features, similar to the techniques used in the excellent British publication *RECOGNITION JOURNAL*. Such a feature should help readers, and photo caption writers, improve their recognition skill.

JOHN A. RICH

Lieutenant Colonel (USA-Retired)

Military Historian

Wauchula, Florida 33873

Changes Noted In ARMOR Format

Dear Sir:

In recent issues of *ARMOR* I have noticed quite a few changes in the format of your magazine. These changes have made *ARMOR* more interesting to the layman.

The most obvious and profound change is in the subjects of the articles. I note with interest the change from almost pure historical articles, to articles on contemporary Armor subjects. I feel that the magazine had become too historical in nature. While lessons can be learned from the past, we must also look at the present and ponder over the future.

The broad range of articles now present in *ARMOR* can be attributed to the different backgrounds of the authors. I hope the present articles are representative of the attitudes of junior officers today.

I consider your department "Pages from the Past" to be an informative and witty comparison of the professional soldier of today and yesteryear.

The timely and informative articles present in *ARMOR* should be interesting to potential Armor officers in ROTC programs.

ROBERT C. STEIGER
JROTC Cadet

Fort Knox, Kentucky 40121

Combined Arms

Dear Sir:

Your September-October issue is a winner! Major General Starry's column on the role of the combined arms team in a modern battlefield environment is both timely and exceptionally well presented. This guidance is truly significant to all combat arms professionals concerned about winning the first battle of the next war, as well as the last battle. The article on SCORES by Captain Crommelin reinforced this thrust by establishing a framework for analysis at unit level, of the shape of the fight to come. At the US Army Field Artillery School, we are instituting the changes required to provide responsive fire support that your maneuver forces will need on the modern battlefield. This is paramount in the suppression of enemy cannon and missile direct fire weapons which threaten the movement to contact of your tank-infantry units.

A new training circular, TC 6-20-1 (TEST) *Field Artillery Suppression of Direct Fire Weapons* has been prepared to explain this new dynamic of field artillery support. Many training procedures are being changed and

other modern battlefield TCs are being developed to add teeth to the "how to fight" effort. This topic has also been detailed in an article, "Suppression," by the Commandant of the US Army Field Artillery School, Major General David E. Ott, which appears in the November-December issue of the *Field Artillery Journal*. The *Journal* is now being sent on a courtesy basis to division and brigade commanders, and to the Armor School for faculty use. *ARMOR* and *INFANTRY* magazines are being reciprocally provided to Fort Sill. This kind of interchange will go a long way toward "getting inside each others' heads" and make the concept of combined arms more than a theory.

On a more personal note, I was much impressed with the conventional deterrence theme of Major Homer M. Ledbetter's article, "Armored Assault Across Europe: Can it be Stopped?" Well written and supported by first class graphics, the article proposed formation of attack helicopter brigades for each committed corps in Europe to smash the armored spearhead of any Warsaw Pact attack. Much the same concept was advanced in my article "Aerial Field Artillery for the Corps" which appeared in the March-April issue of the *Field Artillery Journal*. With full confidence that the test of combat will give rise to a demand for aerial field artillery for massed aerial fire support, I am nonetheless impressed with the need for the conventional deterrence capability the attack helicopter brigades can provide. The concept is sound. The helicopter fired TOW missile's success in defeat of Soviet tanks was demonstrated in the 1972 North Vietnamese offensive.

Finally, it is noteworthy that the Soviets are moving in this direction also, with helicopter-fired antitank missiles used by the Syrians in the October War. Our lead in this area should never be attrited by a post-Vietnam rejection of the attack helicopter in either maneuver or fire support organizations.

WINN B. McDOUGAL
Captain, FA

Fort Sill, Oklahoma 73503

"French Armored Doctrine"

Dear Sir:

After reading "The Enigma of French Armored Doctrine, 1940" by Captain Doughty in your September-October 1974 issue, I was reminded of an article on essentially the same subject by Professor Henry Chabert, "A Possible Historical Mistake: The Causes of the Allied Military Collapse

in May 1940," which appeared in the September 1974 issue of *MILITARY REVIEW*.

I found both articles most interesting, and I would like to recommend a comparative reading of them to the readers of *ARMOR*. It would appear that Professor Chabert, a professor of French at the University of Northern Iowa, presents a more charitable or sympathetic view of the French generals' decisions that inhibited the effective development of an armored force in its own right. Professor Chabert dwells at some length on the uncontrollable factors that strongly influenced such decision-making in the critical period just prior to the outbreak of hostilities in 1940. While I do not agree with all aspects of his "defense" of the actions of the top military decision-makers, it is important to recognize that the will to fight on the part of the French had become significantly eroded. Consequently, Professor Chabert ponders whether "a well-to-do, democratic nation defended by a conscript army composed primarily of easy-living pacifists has any chance to avoid defeat when confronted by an aggressive dictator's highly motivated, hardy soldiers."

Clearly, there is more to winning than equipment and strategy and tactics. I suspect there is a great lesson in the French experience of 1940 for the United States in the 1970s. It seems to me that when we address the subject of doctrine, as Captain Doughty has done, that we *must never fail* to concurrently relate that vital element of the will to fight. I suggest that if one makes an automatic assumption that the latter element is a "given" in any situation, that the ground underfoot is transformed to quicksand.

On to a new and unrelated subject, why not try to encourage more writing from NCOs by establishing a department, such as *As An NCO Sees It*, as a permanent feature of *ARMOR*? I believe that, in 1974, *ARMOR* published only one article by an enlisted man, that by Private First Class Merrick in the March-April 1974 issue. In short, are we really serious on the matter of professional development of armor if the NCO is, for all practical purposes, excluded?

GEORGE G. EDDY

Colonel (USA-Retired)

Austin, Texas 78746

We have earnestly requested and continue to seek out articles authored by NCOs, but have had little response.

— Ed.



THE COMMANDER'S HATCH

MG DONN A. STARRY
Commandant
US Army Armor School

MODERN ARMOR BATTLE II **THE DEFENSE**

In the November-December issue, this column addressed itself to a description of the dynamics of the modern battlefield and how we believe these dynamics apply to the conduct of offensive operations. We believe that if the logic of our dynamics and their application to offensive doctrine is correct, then it follows that logic also applies to defensive operations. And so we have arrived at some conclusions about how defensive operations should be conducted on the modern armor battlefield.

Let's first consider defense in three basic categories. First the covering force, that force forward of the main battle positions, whose mission it is to find the enemy as far away from the main body as possible, to gnaw through his reconnaissance elements, or advance guard, find his main force, force it to deploy, and thereby provide as much information as possible about his strength, dispositions and intentions. Second, the force in the main battle position, whose mission is to destroy the enemy and control an area of terrain. Third, the reserve or reserves held out at brigade, division or corps level, to add depth to the battle.

On the modern armor battlefield, with masses of highly lethal, long-range anti-tank and anti-air weapons, how should the covering force action be conducted, how is the defense of the main battle position conducted and how are reserves employed to add depth to the defense? Four overriding principles seem to stand out when analyzing how the defensive battle must be fought. They are:

First, the threat. Threat in terms of the technical capabilities of the enemy weapons one can expect to meet — the 3,000-meter threat of the antitank guided missile, the 1,500-2,000-meter threat of the tank cannon. Threat in terms of the masses of enemy armor. Threat in terms of how an enemy using Soviet tactics normally brings his forces into battle in echelons, so that while fighting the first echelon one must not forget that the second echelon is on the way and make necessary preparations.

The second principle is use of the terrain. Just as terrain and overwatch were keys to our offensive deliberations, so do they apply as well to the defense. In the defense the basic idea is to use terrain to protect the defender from long range observation and fires from the attacking force.

Third, every defensive position at platoon, troop, company and battalion level should be a mini-ambush which takes advantage of every aspect of the defense wherein the advantage accrues to the defender. The defender can know the ground intimately, site weapons to take maximum advantage of their capabilities, set up alternate positions to which he can move and covered routes to move there. He can dig in, camouflage himself, conceal his equipment and men. All these advantages of the defense must be brought together in an organized scheme which makes each small unit defense a mini-ambush.

Fourth, the defender must at some point in the battle seize the single advantage he does not have — the initiative — he must attack. The purpose of the attack is to destroy the enemy, but to do that in such a way that the defender can get back in defensive positions in time to meet the next attacking echelon. Timing the attack is critical.

Now, the covering force. Although any combined arms force can act as a covering force, we normally think of covering forces as cavalry forces. In modern armor battle the covering force should be an antitank force. For example, recognizing the threat in Europe, long-range antitank guided missile systems have been added to the border regiments; essentially they are antitank regiments. Their mission is to meet the enemy, to delay him as long as possible, kill as many of him as possible, force him to deploy, to bring up his artillery, to arrange a scheme of attack, so that he reveals something of his strength, dispositions and intentions before he comes in contact with the forces deployed in the main battle position.

Several observations about the covering force. Normally it is considered that a corps commander or even, perhaps, a division commander controls the covering force. In many situations, distances covering forces are asked to cover are so great there is some question about whether or not a single commander can effectively command. In addition, the dynamics of massed armor battle suggest that as the covering force comes back, there is some point at which it should come under control of commanders of the forward deployed brigades. This is so because as the battle gets closer to the brigade area, the enemy must be handed off to task forces in the main battle position. This is a very tricky operation, therefore it is important for the forward brigade commander to have some control over the covering forces as they come into his area. Secondly, when the covering force has withdrawn, it has been the custom to reconstitute it as a reserve or to employ it as a rear area security force. Given that the covering force is a highly effective antitank force, it makes sense that there are capabilities of the organization that are needed and can be profitably employed on flanks, to cover gaps, to reinforce units in the forward defensive area or to find the enemy in the next attacking echelon. So another reason suggests that, at some point, control of the covering force should go to the commanders of the brigades in the main battle position.

The requirement to meet and deal with large enemy forces suggests that the covering force should be beefed up by adding artillery and antitank weapons, A2 tank battalions and attack helicopter companies.

Next, the forces in the main battle position. How do they defend? Their first consideration is the threat from long-range antitank weapons. Therefore, the task forces should organize the ground in such a way that they avoid exposure to the frontal fires of the enemy weapons. This suggests extensive use of reverse slopes, so that weapons can fire out to maximum range without exposing themselves to frontal fires of the enemy. For he too knows about the modern battlefield and has forces in position overwatching his moving elements. Each small unit position in the main battle position should be a very carefully prepared mini-ambush. All the weapons the unit commander can bring to bear should be laid in and sited; his men should get out on the ground, walk the fields of fire, go out in front and look

back to see if they can be seen. Where necessary, the position should be prepared by excavating, digging, camouflaging and covering, in order to make of the position the best possible ambush site in which to employ that unit. Barriers, obstacles and mines should all be used to the maximum extent.

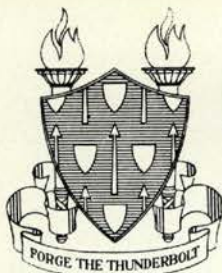
At some point in the battle, task force and brigade commanders should seek the opportunity to attack. Smoke should be used to protect the counterattacking force from long-range observation and fires. Then a carefully contrived attack should be executed, designed to kill as many enemy as can be found before the next echelon arrives. It is not necessarily the purpose of this attack to restore a forward edge of the battle area, nor to pinch off a penetration. The primary task is to destroy as many of the enemy as possible, and get back into a sound defensive posture in time to meet the attack of the next echelon. Each task force commander in the forward brigade area should have prepared his initial defensive position, counter-attack plans to support that position; he should have reconnoitered and prepared second and third defensive positions from which he intends to meet succeeding echelons, and the counterattack plans to support them. He is then, in his own mind, three deep. He has thought the problem back at least three steps.

Now, what about the reserves? Reserves should be employed to add depth to the defenses. Specifically each task force in the reserve, depending on the terrain, should be positioned behind a forward deployed brigade area, and have prepared another two or three positions in depth. Positioned in one, they have looked at two more. The division reserve therefore becomes a force on which the division commander has retained a string, saying to the brigade commander, "Here he is; get him in there, get him locked into your defensive situation, get him to prepare the positions that he is going to use, get him to work out some schemes of attack, but don't use him until I tell you that you can, and tell me when you think it has to be done."

Defense on the modern battlefield, from covering force to employment of reserve, strikes on four recurring notes — threat, terrain, ambush and attack. The pervading logic is identical with that which dictated how to operate on the offense.

☆ In the next issue — cavalry on the modern armor battlefield.

A handwritten signature in black ink, appearing to read "D. Mastany". The signature is stylized with a large, sweeping initial "D" and a long horizontal line extending from the end of the name.



FORGING THE THUNDERBOLT

Master Gunner

Master Gunner courses will be taught in the Armor School starting in late February 1975. These courses will give noncommissioned officers (who have been selected to attend by their commander) a thorough and complete knowledge of the tanks weapons system, tank gunnery and gunnery training techniques.

The plan is to have school trained Master Gunners at the tank battalion/armored cav squadron level and eventually in the tank company/cav troop. This will give the commander an NCO qualified in all aspects of tank gunnery to assist in developing and implementing the unit's gunnery program, teach gunnery and to troubleshoot the program. The Master Gunner will be awarded a Master Gunner's ASI after successfully completing the course.

Prerequisites to attend the Master Gunners Course are:

- Highly motivated, 11E volunteers in the grade of E6 or above.
- Qualified on Table VIII within the past 24 months.
- Selected by the unit commander.
- Two years retention by the unit that sent the individual to school after completion of the course.
- Security Clearance (SECRET).
- The Master Gunner candidate must be an individual who will be respected by his peers and *listened to* by his superiors.

The course will consist of about 45 per cent of the instructional effort on gunnery, most of which will be advanced gunnery, 35 per cent on turret maintenance, and 15 per cent on training management. As can be seen, a great deal of time is spent on the maintenance aspects of the turret. It is not intended that the course produce turret mechanics or turret mechanic supervisors, but an individual thoroughly familiar with turret maintenance so that he can assist the commander in keeping the unit's turrets in a combat ready status, which is necessary to good gunnery. During the course many of the subjects will be prepared and given by the student using training aids that normally are available in the unit. This will help prepare him for the instructor role when he returns to his unit. It also will give the

student the opportunity to build up his personal tank gunnery library that he will start while at the school. Even after graduating, the Armor School will provide Master Gunners up-to-date gunnery literature so that the Master Gunner's library can always be kept current.

During the course, the Master Gunner candidate will have a requirement to develop a model year round tank gunnery program for the type of unit to which he will return.

Master Gunner Course dates and student input are:

M60A1 Course — 12 students, 24 February-16 May.

M551 Course — 8 students, 19 May-8 August.

M60A2 Course — 4 students, 11 August-28 November.

One of the first tasks that the student will accomplish when arriving at the course will be to demonstrate his knowledge in basic gunnery skills. This will be done through a ten station examination (see Fig. 1). This test should not prove difficult to the motivated NCO who knows basic tank gunnery.

Potential Master Gunners and commanders can keep abreast of Master Gunner Course developments by checking future editions of *ARMOR Magazine*.

FIGURE 1 (VALIDATION EXAM)
(FOR *M60A1* COURSE)

- | | |
|------------|---------------------------------------------------------------------------------------------------------------------------------------|
| STATION 1 | VEHICLE IDENTIFICATION
GUNNER'S CREW DUTIES
SUBSEQUENT FIRE COMMAND
BATTLEFIELD FIRE COMMAND
SNAKEBOARD TRACKING EXERCISE |
| STATION 2 | MALFUNCTIONS — FAILURE TO LOAD
PREMATURE FIRING
FAILURE TO FIRE
FAILURE TO EXTRACT/EJECT |
| STATION 3 | REPLENISHER OIL CHECK
COMPUTER CHECK |
| STATION 4 | <i>M73/219</i> MACHINE GUN |
| STATION 5 | <i>M85</i> MACHINE GUN |
| STATION 6 | TURRET POWER OPERATION
RANGE CARDS |
| STATION 7 | LOADING AND CLEARING <i>M85</i>
BORESIGHTING <i>M85</i> |
| STATION 8 | MISFIRE PROCEDURES
LASER SUBCALIBER EXERCISE |
| STATION 9 | RANGE FINDER OPERATION |
| STATION 10 | TANK GUN AMMUNITION |

M60A2 Crew Training

To meet the USAREUR demand for personnel to man the tanks of the newly designated M60A2 tank battalions in Europe, a pilot program for training "package" crews is being conducted by the 1st Training Brigade (AIT) in conjunction with the Armor School at Fort Knox. The program began on 4 November 1974, and the first crews were scheduled to complete training on 13 December 1974. On arrival in Europe, or shortly thereafter, the personnel trained as a crew will "marry-up" to form the nucleus of the newly organized M60A2 tank battalions. Every attempt will be made to maintain the crew's integrity as a team for a minimum of one year from the time the members report to their new assignment in Europe.

The training of the M60A2 crews is accomplished in four phases, each dependent on the other to insure the success of the program. The first phase, or crew identification, is initiated by MILPERCEN to identify qualified 11E tank commanders and gunners eligible for a PCS movement overseas to Europe. Simultaneously, Unit of Choice/Station of Choice and RA unassigned personnel attending the 11E AIT program are screened to determine their qualification for the M60A2 (W1) training program and subsequent movement overseas to Europe. Orders are published assigning the selected personnel by crew number to attend M60A2 crew training on a specified date. The selection and matching process is critical to the ultimate success of the "package" crew training program.

Phase II begins with arrival of the designated tank commanders and gunners at the 1st Brigade two weeks prior to the start of their M60A2 crew training. The first training day of Phase II consists of an evaluation test administered by the 1st Brigade POI Committee. The test is designed to reveal to what extent the tank commanders and gunners are MOS qualified as an M60A1 tank crewman. This is necessary as potential M60A2 crewmen must be fully qualified in their respective crew positions before they can enter the M60A2 phase of training. Personnel found to be weak in specific subject areas are scheduled for remedial training, conducted by the POI Committee and tailored to their specific needs.

Personnel who do well in the evaluation test aid the POI Committee in the conduct of remedial training and are encouraged to offer assistance to their peers during off-duty hours in order to overcome deficiencies. Evaluation test failures, or those judged weak in specific areas of knowledge, are

subject to a retest at the end of the first week. Personnel failing the retest are removed from the program and returned to their home station.

Phase III of the program, or the second week of NCO training, is conducted by the Armor School following successful completion of the Phase II requirement. The Armor School POI consists of 36 hours of special instruction oriented towards upgrading the NCO's qualifications in the performance of tank commander and gunner duties.

Phase IV is the "heart" of the M60A2 crew training program. The tank commanders and gunners "marry-up" with the AIT graduates to form crews and start training in the four week M60A2 W1 MOS producing course. The training program consists of an orientation of the M60A2 turret and fire control system to include maintenance services, loading procedures for both missile and conventional rounds, system check-out procedures and prepare to fire checks and crew firing duties. Following a series of non-fire gunnery exercises and administration of the Preliminary Gunners Examination (PGE), the crews fire Tank Gunnery Tables I thru III (laser) and modified Tables IV, VA, VB, and VIA. In the third week of training, a limited tactical exercise is conducted to familiarize the students with road marches and movement into assembly areas. In the last week of the program, the crews take an end of cycle performance test.

Though basically all personnel are undergoing the same instruction, the tank commander is encouraged to establish himself as an instructor whenever possible. Crew integrity is maintained throughout the training period and the tank commander's authoritative position is well established by completion of the training period.

Some loss of crewmembers due to emergency leave, hospitalization, etc., is anticipated during training. In the event the tank commander or two other crewmembers are lost, the remaining personnel will be moved as individual replacements subsequent to graduation.

The pilot program will continue through June of 1975, with graduating classes scheduled for 7 March 1975, 11 April 1975, 16 May 1975 and 20 June 1975. Each course will be evaluated on an individual basis and lessons learned will be applied to subsequent courses. USAREUR will conduct an evaluation to determine the desirability of continuing the program. If the crew training concept is successful, it may have far reaching implications on the training methodology of the future.



TANK DESIGN PHILOSOPHY

ARMOR Magazine is frequently queried by mail or telephone about some aspect of the many facets of Armor. A most common topic is tank design. There appears to be immense fascination with the subject of how a tank should be configured. The desert battles in the Sinai during October and November 1973 seem to have triggered even greater interest.

"Tank buffs" often view a tank as a complete entity and sometimes fail to realize that many factors influence its design. These "buffs" are very dedicated people who should greatly appreciate articles written by experts ("Tank Analysis" by Mr. Williams in the March-April 1974 issue). Such articles attempt to illustrate the complexity of tank design. It has also been said there is little or no void in tank design technology in the world today. True or not true, different nations simply have different requirements. The complexity of design is generated by two important questions: *What is a particular tank concept expected to accomplish? In what environment is it expected to survive?* When these have been addressed and answered, the engineers can seriously work toward an end.

It must be considered that weapons technology, ballistic protection, suspension, power and human engineering are all a part of the whole.

Based on the mission profile, each aspect might require some compromise in the process of design and fabrication. When one says he is a light tank advocate or heavy tank man or endorses only fast tanks, he really should not be adamant about it. When one views any tank as an entity, it should be realized it is a result of careful study within the state of the art in relationship to employment doctrine. The Swedish certainly did not produce the *S-Tank* on a hunch. The configuration was over 20 years in design and test.

We are often asked, "Is the XM1 going to be the best tank in the world?" My standard answer is that the XM1 will be a culmination of sound technology in relationship to a defined threat. Tank employment doctrine as we witnessed in 1973 is sound. The tank formation as part of a combined arms force has far from retired from the battlefield and for the US, the XM1 should ensure that it does not disappear in this century.

Here are some penetrating questions for the expert: Do we foresee the tank being replaced by the helicopter as a decisive weapon? Will the tank's effectiveness rapidly deteriorate because of the density of antitank missiles? Is the Swedish *S-Tank* effective

as a tank? Why, by design, is the Soviet T62 low and rounded and the US M60 high and squared off? Does a tank have to mount a large gun? Would it not be lighter and faster mounted with just missiles? Is the M551 Sheridan a tank? Will the XM1 look like a typical tank? An evasive answer to all of the above except the last is that essays will continue to be written on any one of them. As for the XM1, I would say yes, it will look like a tank as we know it. It is how it is put together that really counts. If accepted, it will be around and alongside its predecessor, the M60 series, until well beyond the year 2000.

Finally, a tough question: What is the future for United States tank design after the XM1? The first concern, it would seem to me, when considering mounted combat after the turn of the century will be the nature of the enemy or enemies to be confronted. This can be difficult to determine. To digress for a moment, the United States did not expect in 1960 to deploy the better part of the regular Army against the insurgents in South Vietnam, but it did six years later. The tank, in this case, was not a decisive weapon, but it did a splendid job.

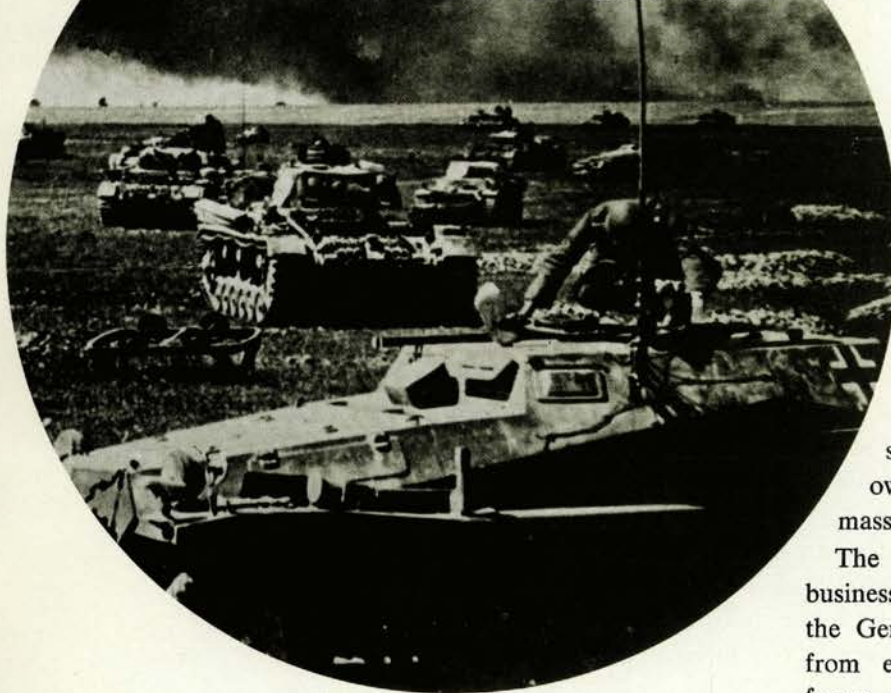
The tank, in fact, had been groomed for 20 years in preparation for high intensity warfare in Europe but it was not a "drop-out" as a jungle fighter. In Vietnam, the helicopter rapidly became primary logistically and tactically yet ironically, in 1960, the helicopter had little priority and the tank had a great deal. Just 14 years ago the scout helicopter displayed two machine guns on the H13 with "chewing gum on the bubble" as a sight and the weapons helicopter had a cluster of free flight rockets mounted on the H19 and H21. Not many people were impressed, especially the *Armor Community*. Now here we are in 1975 flying in excess of 200 knots, carrying mini-guns, missiles, stabilized sights and barrel rolling. Today's helicopter can carry thousands of pounds of ordnance or cargo, night or day. The point is clear to the "tank critic," the helicopter has progressed further technically and tactically in one decade than the tank has in 50 years. Therefore, it might be said, tank design may have well reached its peak and let's move on to something else.

But wait, many will agree that the tank as a configured weapon system is not sacred in itself. However, the requirements for an effective combat vehicle that can survive on a variety of battlefield environments is sacred. We have hung our hat for good reason on the main battle tank as a configuration for sustained combat and as a decisive weapon in both offensive and defensive actions. There does not appear to be anything flying over the horizon that is going to permanently change that any time soon. It is true, the machine gun and artillery removed the war horse from battle. If, by design, however, the tank can effectively protect its crew from an array of projectiles fired from all dimensions, yet in turn efficiently seek out and destroy its prey as an integral part of a combined force, it may be with us for another 50 years (in some configuration or another) before it, too, is ready for pasture.

Editor

KURSK:

The Breaking



by Captain L. D. Holder

On the night of 12 August 1943 the citizens of Moscow witnessed a new addition to the still-evolving set of customs of Soviet Russia, as guns around the capital flashed and boomed to proclaim a triumph over the fascist enemy. The new salute satisfactorily replaced the religiously-tainted czarist practice of ringing church bells to celebrate victory, and its first use marked Russian success in the largest tank battle of World War II, the battle of Kursk.

Following close behind the more celebrated Russian accomplishments at Leningrad and Stalingrad, the victory at Kursk has been somewhat overlooked. Yet in the hard terms of the strategic balance in the east it was more important than either of those spectacular sieges for at Kursk the armored power of the Wehrmacht was finally and irreparably shattered.

Marshal Zhukov called the fight for the Kursk salient "one of the biggest and most decisive events" of the entire war and a few Western historians such as Alexander Werth and Walter Goerlitz agree with the Soviet view that Kursk marked the true turning point of the war. But until recently this immense clash of two million men and 6,000 fighting vehicles has attracted only slight interest among Western soldiers and historians — a fact which has prompted a

considerable amount of irritation and suspicion in the Soviet Union.

Certainly the Soviet achievement in World War II should not be underestimated. Just as surely their competence and toughness contributed to the destruction of the German Army's most dangerous weapon on the plains of the Ukraine near Kursk. Nevertheless, in that critical meeting the German defeat stemmed as much from the failure of their own High Command as from the efforts of the massive and superb Red Armies they faced.

The summer battle grew out of the unfinished business of the winter campaign of 1942-43. After the Germans failed to recover Paulus' 6th Army from encirclement at Stalingrad, their southern forces were forced into general retreat. Field Marshal Erich von Manstein in command of Army Group South performed a masterful retrograde against intense Russian pressure, but by February the Red advance in his sector became nearly irresistible as the forces which had besieged Stalingrad returned to the attack. Nonetheless, Manstein dampened his enemies' offensive spirit with a brilliant counterattack in which his panzers recaptured Kharkov, restored the defensive line of the Donets River and savagely battered several Russian armies caught deep in German-held territory. This stroke, which finally halted at Belgorod in March, checked the Russian advance and forced both sides to pause and reorganize.

Up and down the vast eastern front the situation stabilized, and as it did all eyes turned toward the central segment of the line. There, in a rare juxtaposition, two salients lay side to side forming a long reversed "S" which extended some 400 miles from Belgorod up to Korov. Within the sweeping arcs of the line of contact lay the city of Orel behind the German positions in the north and Kursk in the heart of the Russian reentrant in the south. Commanders on both sides instantly recognized a chance to shear away a bagful of their enemies through offensive moves which would simplify defensive dispositions or which *could* lead to a major breakthrough.

The Red Army still enjoyed the ability to choose

of the Panzer Corps

the place for its next offensive, but every day that passed removed doubts as to where the next Nazi push had to come. Leaders of the Russian High Command saw that their enemies could *only* attack in the central zone of the front — any other solution would risk more than the thinly-stretched Wehrmacht could afford. Highly reliable intelligence sources in Germany soon confirmed their estimate.

The opportunity for a Russian offensive against the Orel bulge naturally caught the staff's attention and tempted Stalin himself, but the High Command decided to leave the next offensive move to the invaders. The wounds of Manstein's February counteroffensive were still fresh, and accelerating Soviet production of tanks and aircraft could only improve the strength of the Russians relative to their enemies — they could afford to wait. Once the Kursk sector was identified as the major threat, Marshal Georgi Zhukov, the Red Army's deputy commander and best field leader, was brought into the area to supervise preparations for a blow the Russians expected in May.

On the German side, hopes had been raised by Manstein's accomplishment and by the end of the Russian winter. The Wehrmacht had dominated the summer campaigns of past years and German soldiers at all levels felt that with the return of warmer weather they could at least hold on in the east. To make the most of their remaining assets the best of Hitler's military men—Manstein, Kluge, Kleist, Guderian—advocated strategic withdrawal to a more compact defensive line from which they could better resist and punish the Russians.

The Army General Staff advised against this, however, and the Fuhrer refused to consider any further pullback. He hoped instead for a limited, but politically significant, eastern victory which might convince Stalin that a negotiated peace would be advantageous. With the Italians wavering and the Western allies readying an invasion of Mediterranean Europe such a solution might be the salvation of the Reich. He was

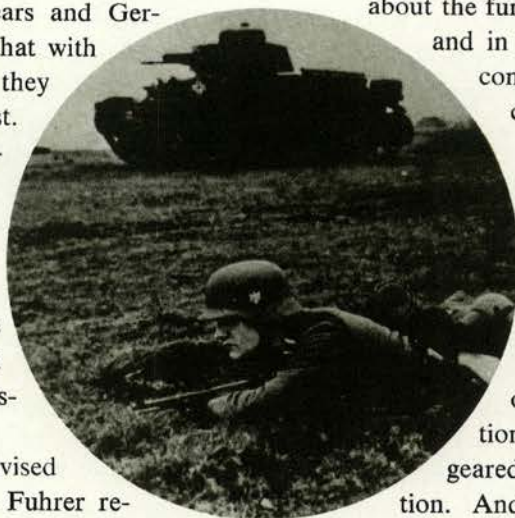
thinking in these terms when he told his generals that "the victory at Kursk must have the effect of a beacon seen around the world."

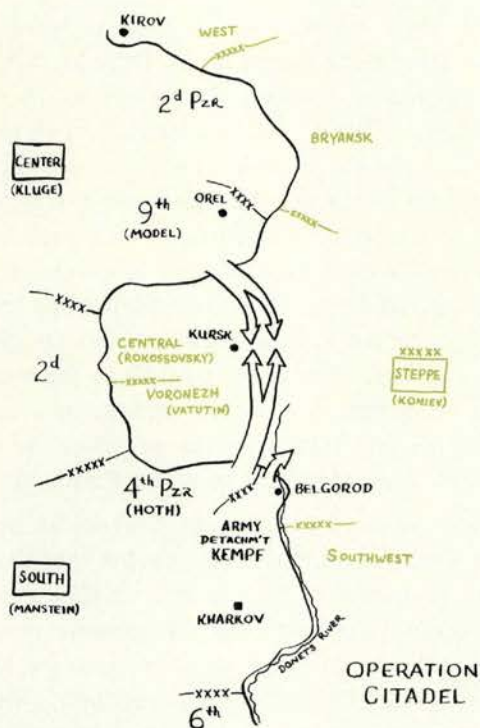
Hitler, then, counted on a great political and strategic gain on the eastern front. Once his advisors and commanders resigned themselves to the fact that withdrawal would not be permitted, they recognized the Fuhrer's proposed operation against the Kursk salient as the next best alternative. Operation Citadel, as the project was dubbed, was planned as a conventional double envelopment to pinch off the bulge at its base and to annihilate the Russian troops trapped inside; it was a pattern which German armor leaders had used often in the past. Since the maneuver was so obvious and would perhaps be seen by the Russians, the staff urged its execution as soon as possible. (See Map 1, "Operation Citadel")

But here again Hitler intervened. Troubled by the risks of Operation Citadel, he insisted that the attack be postponed until the two attacking army groups could be brought to the greatest possible strength. He worried most about augmenting Manstein's and Kluge's armies with the new *Panther* (*Panzerkampfwagen V*) and *Tiger* (*Panzerkampfwagen VI*) tanks which he hoped would be better able to cope with the excellent Soviet *T34s*, but Russian tank production was at such a high level that any delay profited the Red Army much more than the Wehrmacht. Hitler also nursed doubts

about the fundamental soundness of the plan, and in this case he was right; his best commanders pleaded with him to cancel the operation. Manstein grew very doubtful of the plan as time passed and Guderian frankly predicted defeat to the Fuhrer's face after a month of delays.

Between the delays of tank production and unit training on one hand and high level vacillation on the other, Operation Citadel geared up in something like slow motion. And as the forces gathered, the enormous risks of the undertaking became clear to everyone. Virtually all of the Nazi's armored reserve would be thrown into an all or nothing gamble. The number of assault divisions varied between the armies of Hoth and Kempf in the south and Model's 9th Army in the north, but these numbers are misleading because of differences in the strengths





of the veteran units. More meaningfully, Hoth's 4th Panzer Army and Army Detachment Kempf fielded some 1,500 tanks while Model's force had around 1,200. As Martin Caidin points out in *The Tigers Are Burning*, this concentration represented half of the tanks in the Eastern Theatre. They were an irreplaceable asset.

Among these tanks were a large number of the new vehicles upon which the High Command relied so heavily. Hitches in production and crew training slowed the arrival of the new battalions, however, and when they finally detrained in the east, their mechanical weaknesses horrified the division commanders charged with using them. The *Panther* in these early days of its use suffered problems with its drive train which made it highly unreliable. Also the Porsche model *Tigers* were too heavy and lacked any armament other than their main guns. Although the *Tigers'* lack of machine guns cannot have been critical to the outcome of the battle as Caidin suggests in his book on Kursk, the heavy tanks performed poorly because of this omission and because of their poor mobility and agility.

If delay made the attackers somewhat stronger,

though, it made the defenses of the Russians as nearly impregnable as humanly possible. Zhukov divided responsibility inside the bulge between the Central Front of Rokossovsky and the Voronezh Front of Vatutin: between them these commanders had nine armies, a force equal to that of the Germans. Adjacent fronts prepared to hold initially and to counterattack on order. One specially created formation, the Steppe Front of Marshal Koniev, received most of the Red Army's available heavy armor and was held clear of the salient to serve as a supplemental line behind the primary defenses if necessary, but primarily to be driven into the attackers' flank as soon as they faltered.

Inside the threatened pocket, Rokossovsky's and Vatutin's troops worked feverishly through April to be ready for major combat in May. And as weeks passed without action, as May passed into June, the Russian lines became incredibly strong. Civilian labor was requisitioned to help in the digging of thousands of miles of trench lines, and by July these fortifications extended 65 miles behind the most likely points of attack. The Russians also seeded the battlefield with more than 400,000 mines, stiffened the forward zone with 6,000 anti-tank guns and interdicted armor approaches with engineer obstacles. The completed project absorbed half-a-million railway carloads of materials.

From the top of the command structure down to its lowest levels the Red Army's characteristically centralized control measures were effected with Stalin following the details from the Kremlin. Artillery was lavishly and effectively employed; in fact, artillery regiments outnumbered infantry regiments by 50 per cent. Antitank units were sited in great depth and for the first time centrally controlled in the fashion of the German *Pakfronts*.

Intelligence was aggressively and successfully sought from the lowest to the highest levels. This enabled frontline commanders to place their reserves and combat support in the best possible spots while high level intelligence provided Zhukov with such precise details of the German plan that he could concentrate 148 artillery tubes and up to 48 antitank guns per mile along the lines which the Germans chose to attack.

All in all, the fluid situation of February set into a very static one by summer. As Alexander Werth observed, the original circumstances "had so changed that Citadel would have to be fought under conditions exactly opposite those originally anticipated." The Kursk salient had ceased to be a profit-

able objective for German armor: months of delay had transformed it into what the German General Millinthin later called — “the strongest fortress in the world.”

In the face of such a fortress the leaders of the attacking panzer corps, aware of the quality of the Russian defenses but chained to their plan by the Supreme Command, made elaborate efforts to maximize the effect of their assault. Painsstaking reconnaissance, night assembly marches, last second concentration, heavy air support and other measures, however, profited them almost nothing. The massed forces of German armor moved off with the precision, speed and power which had distinguished them throughout the war, but on 5 July 1943 they poured into defenses well prepared to contain and destroy them.

Attacking with almost 3,000 tanks and self-propelled guns, and covered by an air force of 2,500 warplanes the German forces made initial progress in both the north and the south. Model's 9th Army, driving south from the Orel bulge, penetrated seven miles in Rokossovsky's lines while Hoth's 4th Panzer Army, the stronger of the two forces, moved

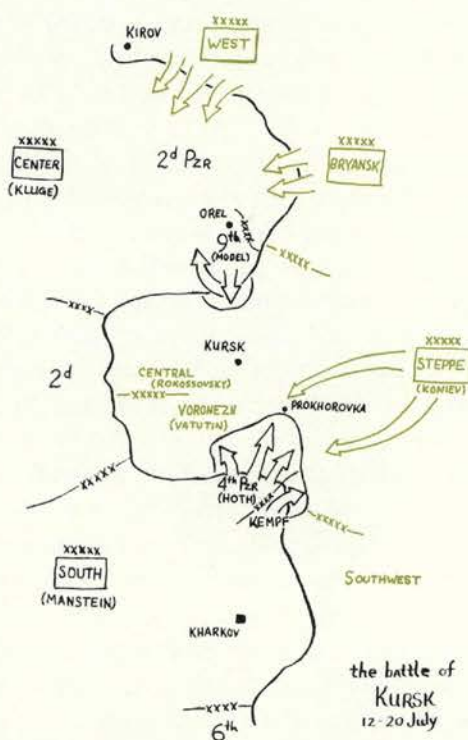
more than 20 miles into the southern face of the salient with Kempf protecting its right. But both forces moved slowly and neither could escape the labyrinth of defensive works. Although they cut deeply into their enemy's positions, they never broke through them and never came within 70 miles of linking up. (See Map 2, “The Battle of Kursk”)

Every local victory for the Wehrmacht only uncovered fresh Soviet positions farther to the rear. Russian antitank guns and mines did terrific damage to the armored spearheads of the attack and every day after 7 July saw a marked slowing of the German drive. Heavy rains and intense artillery fires helped to contain the thrust until reserve tank regiments and divisions could move up to hack at the Nazis. Although the Red Army lost as many tanks as its foes, the technological balance had not been upset by the introduction of the new German types. Operation Citadel, planned as a thunderclap, subsided into a sluggish, bloody stalemate. Model ruefully described it as “a rolling battle of attrition.”

On 12 July, moreover, the stalemate ended and Zhukov seized the initiative. With the German assault forces locked indecisively inside the southern bulge, he drove his own Bryansk and western fronts into the Orel salient. On the next day Hitler formally called off Operation Citadel because, he said, of the Anglo-American invasion of Sicily which had begun on the 10th. Some writers feel that Sicily provided more an excuse than a reason for the cancellation; at any rate the decision had little bearing on a battle already lost. Kluge's Central Army Group was in serious trouble and Model's stalled divisions would have been recalled in any case. By the 15th they managed to escape the fight around Kursk and join the battle in the north.

In the south, major elements of the Red Army's main reserve (Koniev's Steppe Front) entered the action on the 12th. Zhukov had committed bits and pieces of this tank-heavy reserve throughout the first week of the battle, but now he detached a force of four armies from Koniev and sent it to help Vatuln stave off Hoth. As in the past the better-trained and better-controlled German tankers cut up their opponents badly, but also, as in the past, the Russians had the numbers and the resolution to press on even under harrowing punishment.

The clash of 1,500 tanks near Prohorovka on the 12th was the single largest engagement of the long battle and the last gasp of the armored offensive. There, as elsewhere, the Germans won possession of the ground, but only at a prohibitive cost and





"Every local victory for the Wehrmacht only uncovered fresh Soviet positions farther to the rear."

without inflicting a fatal injury on the defending front. From the 13th to the 23d of July, Manstein's forces backed awkwardly out of what had become a trap. By the latter date the Russian salient was fully restored.

The carnage on both sides was appalling; precise figures have never been established, but nearly 150,000 men lay dead among the hulks of thousands of fighting vehicles. The razed countryside and ruined trenches reminded German veterans of the First World War's western front. Exhaustion prevented immediate exploitation by the Russians, but the tide of the campaign — and also of the war — had clearly turned.

In the strategic sense, the greatest casualty of the affair was certainly the German armored corps. The mobile forces which had carried the burden of Nazi aggression and had become the Wehrmacht's most effective weapon now lay shattered. The loss of over 1,000 tanks meant that such a striking force could never be gathered again; the Germans would never regain armor parity with the Russians. What remained of the eastern war could only be methodical attrition and no one could doubt its eventual outcome. Painfully the Red Army kept pressure on its enemies and more painfully the Germans fell back to the west. New fronts in Italy and later in Normandy only underlined the hopeless odds against Hitler's Reich after the summer of 1943.

In retrospect a number of things stand out from the operations against the Kursk salient. The resourcefulness and coolness of the defending soldiers

of the Red Army and the skill and discipline of the outnumbered German attackers are impressive, but the problems posed by the salient and the attempted solutions are of more lasting professional interest.

The difficulty of piercing well-organized positions on a prepared battlefield strong in antitank defenses is considerable and should never be underrated by armor leaders. Now, perhaps more than then, the existence of small and accurate antitank weapons dictates more careful employment of armor than the Germans demonstrated at Kursk. There the speed and shock effect of tank formations was largely wasted by the predictability of the German plan and the choice of what turned out to be a frontal assault. Armor units succeed best when they appear unexpectedly or before defenses can solidify; their use as battering rams degrades their effectiveness and nullifies the advantage of superior mobility.

The German over-dependence on technological superiority to offset numerical odds and to overcome enemy armor in the battle of Kursk may also be worth noting as something of a parable. It is true that most of their difficulties with the new *Panthers* and *Tigers* resulted from inadequate field testing and that the *Panther* at least became a superior fighting vehicle later in the war. Still, the Nazi leadership's excessive trust in the decisiveness of technical improvements offers us a lesson and a warning as we ourselves adopt ever more costly and sophisticated tanks. Quantity, simplicity and reliability of tank types can be as vital as high quality, and a reasonable balance between com-

plexity and dependability — a balance such as the Russians obtained in the *T34* — must be maintained.

Kursk further provides a demonstration of the debilitating effect of holding an enemy in ideological or racial contempt or of making easy assumptions based on past experience. Habitual degrading of Slavs and trust in the seasonal dominance of their own troops cost the Germans dearly at Kursk as many other underestimations have cost many other armies throughout history.

But overshadowing all else in the battle is the ineptitude of the German High Command which through inflexibility and lack of imagination doomed its own cause and its best troops at Kursk. Grand strategy is the province of diplomats as Clausewitz acknowledged, but a large measure of tactical freedom must be left to commanders in the field: as German doctrine held, armored forces must be commanded from the front. By ignoring the advice of front line commanders early in the

planning of Operation Citadel and by holding them to an outdated plan months after conditions in Russia had changed, the High Command in Berlin effectively neutralized the expertise of its field commanders. In doing so the highest political and military leaders of the Reich signed a death warrant for their eastern armored corps. Actual execution was left to the Russians.



CPT L. D. HOLDER was commissioned through ROTC from Texas A&M University in 1966 and holds a Master of Arts degree in European History from Harvard University. He has commanded cavalry troops in Germany and Vietnam and is presently an instructor of European history at the US Military Academy.

“ABE”

When I was assistant commandant of the Armor School in 1948-49, Lieutenant Colonel Creighton W. Abrams was the chief of the Command and Staff Department. I called on him often in his department to discuss many things and to get his advice.

One day I said, “Abe, you are destined to be a general. We do not want any little thing to interfere with your rise to the top of the Army. The top people in Washington are paratroopers. You have not qualified in that: I can arrange for you to go to Benning to get your jump wings in a few days. When would you like to go?”

To which Abe replied, “If I am to be a general, there are so many things I need to know more than how to jump out of an airplane that I don’t feel I should spend any time on that.”

This told me the great thing about General Abrams’ character. He did not waste his time and looked with disdain upon getting his “card punched.”

General Bruce C. Clarke
USA — Retired

COLONEL ETERNAL

by
Bill Herman

and the US CAVALRY

Being a Cavalry Officer in an Infantry regiment wasn't easy, especially when crossed sabers were an embarrassment to the commander.



One day in 1941 I turned myself in to the Draft Board, and discovered some things my friends hadn't told me about the Army. Such as Fort Knox, Kentucky.

I liked it! These were the waning days of the Old Cavalry. The horses were now quartered off post and exercised once in a while by the officers' wives and by the colorful old hard-pants troopers who would go out there to weep and wail over the old days. But on post we now had the lusty "Gasoline Cavalry" and it was fun in a rough, deadly sort of way. My happiest days were in the recon troop where one platoon was still "mounted" — on 28 motorcycles! Then there were always the tanks — lively, over-powered little "combat cars." It was the place to be during the big gas shortage. We always had gas!

Although I was happy in the Iron Cavalry and stayed on through the war at the invitation of the President, in 1946 I left the service and enrolled in school again. Soon I busied myself as a new-born civilian, but life lacked something. Then one day I realized why I was unhappy.

I was in love with a tank!

Oh, not any special tank; if you've had one, you've had them all. I just liked tanks. Dirty, noisy, foul-smelling tanks and tankers of the same nomenclature. I mentioned this to my Reserve Corps advisor. He said, "And we love you, too! Europe is full of tanks crying for tankers! Come back on active duty — oh, we have some delightful tank battalions in Germany."

So I was shipped to Korea.

I heard I was to replace the operations officer at the Tidal Basin. The title of "Basin Officer" seemed obscene, unsanitary and not for me, so I did the normal thing . . . volunteered for the Infantry.

An Infantry regiment holding the 38th Parallel needed a new CO for their cannon company — armed with real, honest-to-God, tape and bale-wire M4 tanks!

On the day I signed into the regiment, it received

a new TOE wiping out the cannon company, and I was assigned to a rifle company.

From the moment I reported to the regimental commander, we recognized each other as kindred; we each had equally strong, and divergent ideas on the structure and future of the United States Army.

He immediately gave me "The Talk." The reader will be spared all but the finish:

" . . . so isn't it a historic truth that there's only ONE branch of service — The Infantry? Is there any earthly purpose for any other branches except to serve the Infantry? My son, this is the proudest moment of your life — the day you begin your duty with the Infantry! Because today you accept your true purpose in life — you are an Infantry soldier. Because The Infantry is ETERNAL!"

I was glad he finished because his office was hot and stuffy and besides, he was beginning to froth a little.

But now I knew why his nickname was "Colonel Eternal."

"Wait! Come back — I forgot something!" he barked. I stepped back to his desk where he was fishing wildly in a drawer.

"Naturally," he purred, "since you are now one of my company commanders, you will take those sabers off your collar and put on these cross-rifles."

"Naturally, sir," I agreed, "when you procure orders relieving me from my basic branch which is Mechanized Cavalry, I shall be happy to put on the idiot-sti. . ."

"Stop!" he roared. "We don't use that phrase in the idio . . . I mean Infantry!" Then he softened back to his old scheming self again. "How will it look — having one of my rifle companies commanded by a cavalryman?"

"Well, sir," I said, pushing back the brass rifle insignia he was sliding across the desk toward me. "I am not allowed to wear that insignia."

"Allowed?" He was ready to go back into "The

Talk" again. "Allowed is it? Indeed! It is an HONOR not accorded to everyone. *I'm* allowing you to wear cross-rifles!"

"No thank you, sir."

"I'm *ordering* you to wear them!"

"I can't wear them, sir. My Branch says. . . ."

"Get out! Get out!" He was starting around the desk after me, I thought. "We'll settle this later! Go take over your company. Try to keep out of sight. Work as hard as you can — maybe you won't be noticed."

But I was noticed. I had inherited the regiment's best-marching company and my first public appearance was as Honor Guard for a VIP from Tokyo. As the State Department aides and "Colonel Eternal" ushered the VIP toward me and my bob-tail, dismounted company of Infantry, I turned, faced my men and did the natural thing. I bellowed:

"TROOOOOOoop! TengeHUT!"

The VIP stopped dead in his tracks. He spun on the regimental commander jabbing his finger in my face. "What the hell is this? A rifle company or part of Mosby's Raiders?"

That night I was reassigned as a battalion S2.

The next day was Easter and the company commanders and battalion staff drew straws to see who would take the day's patrol up to the Parallel. I drew the short straw to take the long tour of the battalion's three outpost stations.

Coming near the Parallel I noticed a strange stillness. Nothing stirred at the first OP itself, but I took in the patrol of four jeeps with all the stealth of a line of tourists pulling into a gas station. I stomped and yelled through a Quonset hut to rouse the Korean detachment. The hut was deserted. I tore open the back door facing North Korea, and was met by a swarm of lead bumble-bees of various calibers — I closed the door and ran south through the hut. My patrol was even a little further south — in a dry creek bed — their weapons still in the jeeps! For the first half-hour in the ditch, I swore the buttons on my parka were two feet thick. I felt I was lying across a stone wall. After

a bit the fire slacked off — probably "chop-time" — and the drivers made a break for the jeeps. So we departed our "Easter in the Country" — this time driving like commuters late for work.

We became famous — the first American patrol to be fired at on the Parallel in a long time. "Colonel Eternal" had only one terse comment: "I think you got lost and headed into North Korea!"

On my next patrol we never got near an OP. Small-arms fire zipped around us as we came around the last curve.

Then for a week the border was quiet again.

As I was leaving headquarters for my third patrol, I heard the Colonel instruct his OD: "Call me when he gets back from this one," he growled. "No, dammit! Call me if he doesn't get back!"

This time we got six rounds of mortar and four rounds of light artillery thrown at us — with my patrol trapped under a bridge. In fact, the whole border lit up along its length. We got out of there under the "covering fire" (quotes mine, as we were in danger from *both* sides of the Parallel).

Next day I was again assigned to a rifle company. S2 had orders that I would not, repeat NOT, take my weekly patrol but would FLY as an observer in the L17 ONLY.

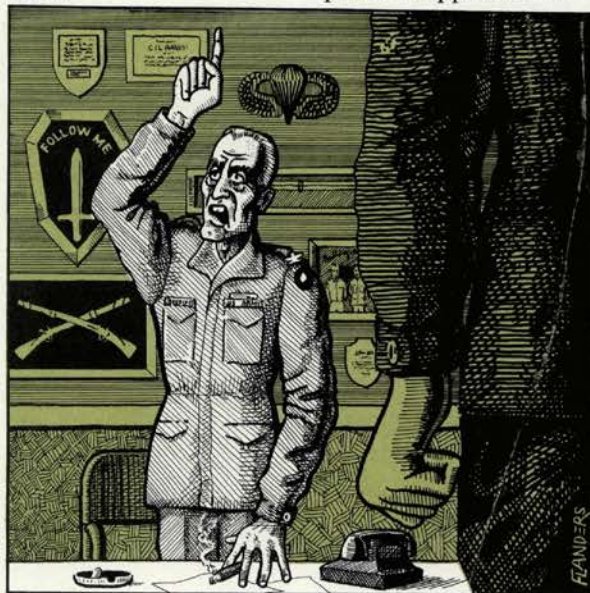
So I settled down to the garrison life of an Infantryman, and the border was quiet again.

Don't get the impression that life in the Infantry was humdrum. Not

with "thirty-three years of straight-legged Infantry" wrapped up in one bull-voiced colonel who would greet me on every occasion with: "WHEN will you take those idiotic papercutters off your lapel and put on something respectable?"

The problem of my Cavalry insignia alone kept my life from jading. And Colonel Eternal had many wiles and tactics. He was most dangerous when he became confidential and solicitous.

"How would it be," he once asked in my mess hall (while plucking a grain of darkened meat out of the darkest corner of my refrigerator), "How would it be if I were in *your* regiment, or combat



" . . . today you accept your true purpose in life — you are an Infantry soldier. Because The Infantry is ETERNAL!"

group, or whatever you call those Armored things, and if I were wearing cross-rifles on my collar? Now wouldn't that be ridiculous — cross-rifles in the Cavalry?"

"Well, sir," I answered, "Cavalrymen also fight on foot. In fact, a good infantryman properly trained and aged can sometimes make an acceptable cavalryman. . . ."

"Enough!" He had been at the point of launching "The Talk" as he glared into my clear-eyed, open face.

"I am merely trying to tell you," he pronounced slowly, "you and that hideous insignia have become a deep embarrassment for me. A cavalry insignia leading a rifle company! Why, you're even known in Tokyo. I implore you — *please* take off those damn sabers!"

"Colonel, I can't take them off." I explained patiently, trying to help him in his anguish. "Perhaps if you would think of them not as sabers but as bent bayonets."

"Don't be impudent, young man!" he snapped, locking me with his "The Infantry-is-Eternal" look. "We may be short of captains in this command, but we have many senior lieutenants — who can do as well as a cocky, strutting left-over of the smelly . . . yes, get this mess hall cleaned up or get a mess sergeant who can!"

He didn't notice that the mess sergeant, the dining room orderlies and all the KPs were swarming nearby, catching every word of our repartee. They, like the rest of my "troopers" were confirmed or impressed infantrymen but were definitely on my side in the impasse with Colonel Eternal. In fact they were exhilarating in a vicarious defiance of authority. Morale in this company had never been higher — despite the fact that almost all of the money in the company was tied up in side-bets, "pools" and syndicates predicated on when — or if — I would be forced to take off my cross-sabers and put on the Infantry "sticks."

One day he made a flanking assault on me — through the motor pool which gave him a chance to inspect my entire area. This visit was to investigate — and stop — the rumor that my unit would be deactivated and reactivated as a TANK COMPANY!

I had some ideas about where and how the tank company rumor got started. Snatches of heated conversation would reach me in the company area as the troops discussed new concepts of branch and Army organization.

"If he ain't supposed to wear the rifles," a voice

from the grease pit muttered, "ain't they supposed to give him tanks or somethin'?"

"Yeah," agreed another motor-pool strategist. "If he's Cavalry, then we're Cavalry!"

Of course, you're only getting my side of it all. Colonel Eternal was a skillful, formidable opponent and he won numerous rounds. The one that hurt me (and my men) most and almost made me capitulate, was The Incident of The Band.

About this time, the Regiment began to assemble its own band. It was soon apparent that we had more instruments than bandmen — in fact twice as many. Colonel Eternal thought it was a shame to waste the extra instruments for lack of players, so he called me — personally.

"Now then," he started, in that rasping purr he saved just for me. "Here is a mission just made for you and your company. Tankers are trained to handle all sorts of equipment, no?"

"Yes, sir?" I decided to start fencing with him. "The equipment of a Cavalry unit is. . . ."

"I'm aware!" he cut me off. "For the parade this afternoon, I want you to send the Bandmaster 15 toters."

"Toters, sir?"

"Yep, toters. Fifteen men to shine up the spare band instruments and tote them to fill up my band. Got that?"

"But, sir — I can't ask my men to do that!"

"You don't *ask* 'em — you *order* 'em! So get them over to the band barracks and get to shining those horns and things. I wanna see some real totin'!"

"But sir!" I had to play my ace. "My men are *Infantrymen*!"

"I'm aware," he snapped. "But there is some doubt about that, too, now. I want toters only, now send 'em over!"

"Yes, sir," I said weakly to a very heavy and very dead phone.

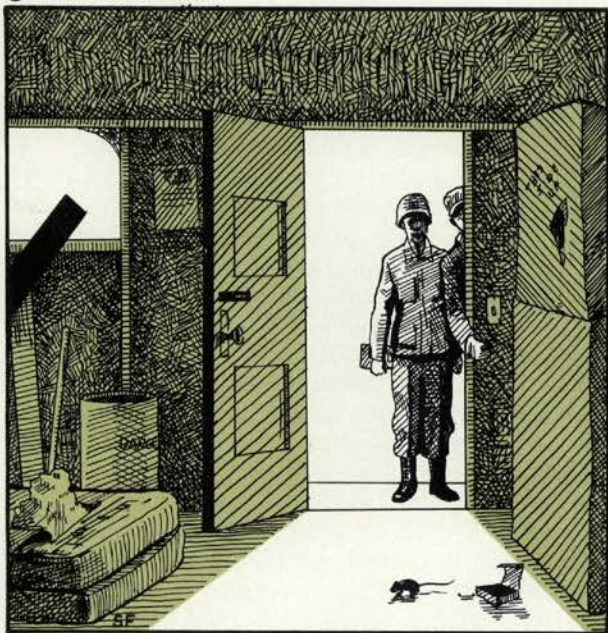
For any other unit, this "toters-not-tooters" assignment wouldn't have been too bad, but for my company — proud, cocky, defiant — it wasn't easy, but it was done.

The instruments were green and foul from disuse, but my "toter platoon" had them spit-and-Cavalry-style in no time (we had instrument-maintenance classes!). My troopers did the usual outstanding job.



They toted like veterans and the regimental band *looked* good anyway. Soon the hurt look left their eyes and they forgave me.

About this time the Colonel's attention was invited to the fact that I was still refusing to sign for the property in my company. I had been rushed into command of the company on his orders to relieve the young lieutenant who was the victim of a horrible error — his rotation points had been computed wrong. He had one more point than he needed to get out of Korea.



"What I saw there was the despair of every supply sergeant and scrounger."

So Eternal suggested I sign for the property sight-unseen. I protested. The Colonel cajoled me with, "Not right now — wait 'til the DB comes out in the morning. You'll find your orders listed there!"

He was right.

My first effort, of course, was to get the orders amended to read "Captain, Cavalry" instead of "Captain, Infantry" (must have been an administrative error — he had more respect for me than to try such a sneak play).

Next I took one look at the supply records. Then the company "rat's nest." What I saw there was the despair of every supply sergeant and scrounger. There were things like 35 Sibly conical stoves, 140 cases of C-rations (tainted and condemned), 185 mattresses (which Korean KPs promptly gutted open to peel off the striped ticking), and *one* item that had to come out in daylight someday. I couldn't keep it hidden forever.

Back in one corner were the doors of a C-47!

No real mystery. A '47 had cracked up some time ago near the Parallel. My predecessor, *very* young and unselective at the time, made a raid on the wreckage before the Air Force could remove it. He had some idea for making a porch or patio-deck out of the clam-doors but never got around to it.

The S4 refused to touch them until I first picked the doors up on my property book. The IG said I'll do no such thing until the Air Force declares them lost. The Air Force said, "Are you crazy? We don't have any C-47s without doors!"

But the whole regiment managed to enjoy or endure the impasse without letting the regimental CO get wind of it — except that I still refused to sign for the property and the S4 refused to tell him why.

One dark night the ridicule was all I could take at the Club. I fortified myself with a few more sour-mashes and called for my jeep and driver. We loaded up the C-47 doors, and drove them to the regimental supply office. We carefully balanced the doors on the S4s desk and I wrote out the turn-in slip: "Doors, C-47, less airplane."

I signed it, locked the door, said good night to the guard and went back to the Club to have a few drinks with the S4 while we were still friends.

The phone call in the morning was superfluous — I could hear Eternal through the window: "You Gahdamn Tight-Pants Maniac! Get the Hell up to my office immediately!" He was howling like a sabered stallion.

Then occurred the strangest experience of my life in the Infantry. While the S4 was enumerating the various charges against me, including badgering the guard, breaking and entering, abandoning government property, the CO was staring at me and making the strangest sounds. As the S4s voice became higher and more shrill, the sounds emanating from old "Eternal's" throat became more and more recognizable. He was snickering — then HE WAS ROARING WITH LAUGHTER!

I wasn't about to fall for this new approach until he *ordered* me to join in.

"And in three days," announced "Old Eternal" jovially, "you will have been on Infantry detail for 90 days. Then you WILL take off those damn pig-stickers and put an honorable insignia on your collar."

He caught my wild look toward the calendar.

"Hah! You forgot, but I didn't. I said I'd make an honest infantryman out of you and I did it. Stop fighting and put the cross-rifles on now!" He began fishing in his desk.

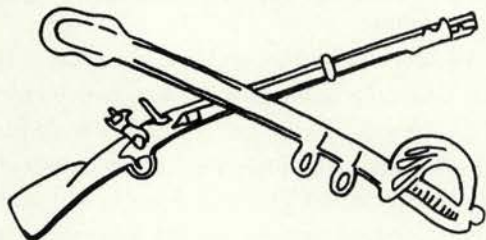
"Sir, I'm still Cavalry," I said, to bolster my own spirits, not to convince him. "I'd like to wait my three remaining days."

"Ah, you Hard-Pants are all a little touched, but go ahead. Enjoy your dying branch a few more days, but you can't lick history. You trick-shots come and go but the Infantry is eternal!"

But fate intervened. Next day the captain in charge of the only Mechanized Cavalry Troop in the command was promoted out of his job and I had to take over the troop — *with sabers-on-guidon, yet!*

That was my short-but-lively tour in the Infantry. If the Queen of Battle looks a little haggard sometimes, don't blame me — I didn't design her insignia. However, I subsequently found the solution that could have saved "Eternal" a lot of trouble. Some years later I was assigned as an instructor in an Officer Basic Course. The faculty was almost 100 per cent Infantry. Although, I was the only tanker on the staff, I was assigned to teach the Organization and Employment of the Infantry Rifle Company.

Naturally, the ribbing I got was pointed and vicious — tankers have their feelings hurt when it isn't. One morning, coming in from my classroom, I found on the wall behind my desk a huge drawing of the insignia that could have been the answer to my old regimental commander's anguish.



Colonel — wherever you are — I'll wear it if you will!



BILL HERMAN is a former heavy tank and recon troop commander and civilian information officer with Headquarters, Combat Developments Command at Ft. Belvoir. He retired in June from his last assignment in the Secretary of the Army's Office for the Freedom of Information.

DID YOU KNOW?

WHY NO J COMPANY?

There is a considerable amount of unfounded folklore as to why our Army has no J companies. The most romantic story is that J companies did once exist but one of them so thoroughly disgraced itself that the designation was abolished. This is sheer fabrication. Another hot-stove hypothesis is that we have no J companies because the Roman Army had none. The only thing wrong with this theory is that the Romans didn't have any A, B, C, D or any other lettered companies either. Roman companies (which they called centuries) were numbered.

The American Army started lettering its companies in 1816. Since the script "J" looked so much like "I" the letter J was not used. (J is the most recent addition to our alphabet and when first adopted was used interchangeably with I. Remember also that the Army of that day relied entirely on handwritten orders and correspondence which made the likelihood even greater that the Is and Js would be confused.)

Up until 1816 the standard regiment consisted of ten companies. In the early days the regiment and battalion were identical. Eight of the ten companies were known as "battalion companies." Following the British pattern, the other two were elite or "flank companies." (One of these the British called the "Grenadier Company" and filled it with men picked for their strength and courage. Sometimes the grenadier companies were detached from their regiments and used together in provisional grenadier battalions (e.g., at Bunker Hill). The other flank company was called the "Light Company." They were used as skirmishers ahead of the main line. They too were often detached and used in provisional battalions. The Americans did not organize any "grenadier" companies; both "flank companies" were light infantry. Lafayette commanded the Corps of Light Infantry in 1780 and under him it made the chief assaults on Yorktown the next year.)

The eight "battalion companies" up until 1816 did not have permanent number designations. "For training and for battle purposes, the eight battalion companies were placed in line by a complex arrangement according to the seniority of their captains, which seems to have had its origin in the protocol of medieval armies. It had no functional basis, since once lined up, the companies were re-numbered from right to left."

Under the new 1816 system, the two flank companies got the letters A and B, and the others C through K. Mahon confirms the theory that "there was no J Company because J was too easily confused with I in writing."

From Military Customs and Traditions
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the M60A2 in perspective

A Message to the Armor Community

by Lieutenant Colonel Vernon E. Ebert

For a good number of years, the *M60A2* concept and the tank itself have been examined, tested, retested, discussed and cussed. The latest (and last?) test of the tank has recently been completed and some 400 will be placed in our operational inventory in the near term. The time for hashing over the concept of this particular tank has ended. Likewise, the time has ended for speculations about its maintainability, "troop acceptance" and relative effectiveness. The time has arrived for accepting the *M60A2* into our formations and applying ourselves toward its most effective and efficient utilization.

I write this message fresh from having commanded the first battalion of *M60A2* tanks through their initial introduction into a TOE unit. This introduction consisted largely of a battalion size troop test of about six months duration (average 1,100 miles and about 100 rounds per tank) and a follow-on seven-week collection of materiel performance data (750 miles, 150 rounds per tank) of 24 tanks (including seven *M60A1s*). These tests resulted in a few fixes on the hardware and in the proposed training and logistic packages and the decision to move ahead with deployment to the field.

The essence of my message is that the *M60A2* is a good tank and it can be maintained. The purpose of this is simply to spark some degree of enthusiasm for and confidence in the tank. The attitude toward the tank of those who find themselves in an *A2* unit is of key importance in the success of that unit in effective maintenance and operations. The same, of course, could be said of any piece of military hardware — for example, the *M16* rifle — but the *M60A2* is more sophisticated and complicated than any other tank and is therefore slightly more difficult to maintain and operate. A "good" *M60A1* tank crew generally will have fewer maintenance problems and score higher in gunnery than a less motivated crew. The same "good" crew will likewise have fewer problems with the *M60A2*. The lesser crew may well bomb out completely in an *A2*. It requires slightly more detailed daily "care and cleaning" in order to remain fully effective in all of its unique systems; however, the time required for daily maintenance and operational checks need be no greater than that which should be taken on any tank.

To put it another way, positive motivation and quality of crew performance are far more important

in keeping an *A2* fully operational than in keeping an *A1* fully operational.

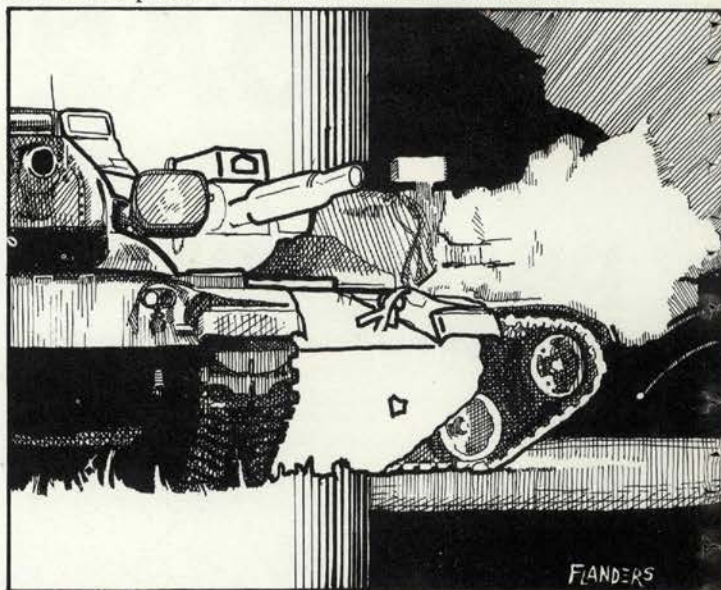
DIAGNOSIS AND REPAIR

With the greatly increased number of electrical components in the turret of the *A2* you may expect an increased number of problems in that area, however, due to the duplication of controls and functions in these components the effect of this on operational readiness and, as important, on your trooper's attitude, need not be overwhelming or even too serious. The key here is quick, correct diagnosis of the malfunction and immediate availability of spare parts. Quick diagnosis depends upon experienced turret mechanics and maintenance supervisors who can rapidly execute the correct troubleshooting procedures. Schools can not fully provide this experience. Company or battalion mechanics (fresh out of school) will have gained the requisite experience only when the battalion has gone a good way into its initial gunnery session. (Lest this be a discouraging thought, have faith. The electrical/hydraulic challenge of the *A2* turret brings out the very best in bright young turret mechanics. As problems repeat themselves and understanding of sub-systems increase, the turret becomes less of a monstrous enigma and more like a Model T Ford. With the assistance of more detailed flow diagrams and a more comprehensive fault isolation test set, both recommended as a result of the troop test, this aspect of maintenance should improve greatly.) The non-availability of some parts during our troop test became a major problem with respect to the attitude of the tankers toward the tank. If future units start their *M60A2* program with the prescribed load list/authorized stockage list (PLL/ASL) recommended by the troop test report, there should be no problem in this area. (The volume/cube of the recommended 70 plus lines of *A2* peculiar parts and components will not greatly overtax the unit's storage and hauling capability. Also, there will most likely be a decrease in this recommended load as the result of some "fixes" being put on the system and perhaps more authorized local repair/DX. Presently, most of the sophisticated turret "boxes" must go to the depot level for repair.)

Most of the frequently higher failure rate will occur in components of the stabilization and fire control systems. A large number will be loose electrical connectors and other minor problems. As the tankers gain more experience and the quality control or shipment bugs get worked out, most of the minor problems will fade in significance, either

because they have been repaired once or because correct diagnosis becomes the rule on recurring problems and quick repair is possible — again, an adequate PLL/ASL is an absolute must. Because the tank is slightly more difficult to maintain than the *A1*, crew daily maintenance checks in the turret and Closed Breech Scavenging System (CBSS) must be more carefully and consistently made than the average tanker is prone to do. Basically, though, the tank is a good one, considering its sophistication, and can be maintained — commanders must not let the progress of the necessary learning curve prematurely discourage their tankers and mechanics.

On the automotive and commo side, basically the same problem will arise as with the *A1*. The CBSS will present some minor leaks but these can



usually be repaired quickly — often by the experienced crew. We had a slightly greater problem (than with the *A1*) on voltage regulator and/or generator failure — but all of the tanks going to Germany will have an improved regulator (solid state) which should obviate the problem. Eventually most all *M60* series tanks will have an improved regulator and generator.

GUNNERY

In gunnery, two of the most important actions are careful, "by the book" aligning of the laser and bore-sighting the coax machine gun. We also had a major problem with the laser mounting bolts which periodically worked loose and dropped the laser out of alignment. New type bolts which should solve the problem are being tried in the 1/67 Armor at Fort Hood.

As with the hang out of battery problems experienced by some of the early units, careful test and

correction procedures applied prior to shipment of the tanks should prevent the recurrence of these problems. This problem should not appear in future issues due to careful test and correction procedures being applied prior to shipment.

We experienced feeding problems with the coax and cupola mounted .50 caliber, which the experts were working on at the time of this writing. Careful and "by the book" coax mounting and feed mechanism adjustment is imperative. One major plus in this area is the fact that the *M85* is fully and easily accessible from a buttoned up cupola and is fully powered and stabilized — a true pleasure to fire.

In training for stabilized gunnery, the loader and driver must be given more attention and drill. The gunner (as with the *M551*) should have ample practice with the *M41-M42* conduct of fire trainer. Though the "new" turret and fire control configuration may initially scare the ex-*M60A1* crewman, because of its seemingly over-complication, this feeling disappears with crew drills and firing. Except for loading, it is easier and quicker to get off a well aimed round with the *A2* than with the *A1*. Motivated and knowledgeable crews will outshoot most of the *M60A1* crews and will even show well, in comparison, when firing on the move over smooth terrain. The tremendous potential combat effectiveness of stabilized gunnery, with this tank, has yet to be fully exploited and, therefore, appreciated. The system is highly accurate — it remains to the crew (as always) to put it all together. (As a side note, the high firing crew in the 1/61, during the troop test qualification firing, consisted of an RA Transportation Corps second lieutenant, two truck drivers recently retrained as gunner and loader and one 11E10 as driver.)

TACTICAL EMPLOYMENT

Special platoon fire distribution techniques have been developed for *M60A2* platoons, and are outlined in *TC 17-15-5, M60A2 Tank Unit Employment*. The missile is deadly accurate and highly reliable (compared to the *M551* system). The main gun (conventional round) is quite accurate out to a good distance — given a good zero and an experienced crew.

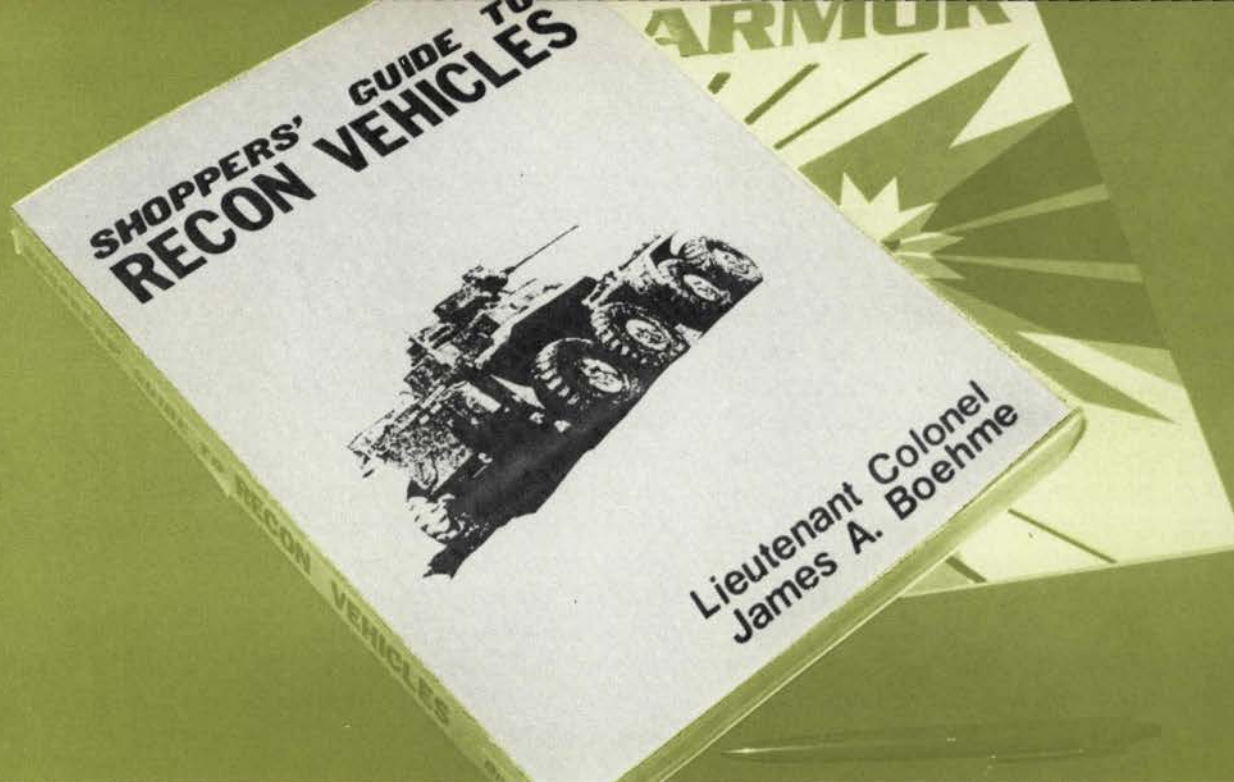
In task organizing, think first and foremost that you have a tank and not some narrowly useful, special, antitank weapon. Use Mission, Enemy, Terrain and Weather/Troops available, and if you expect long-range target acquisition and want to engage as early as possible, then put the *A2s* wherever they can do the job with their missiles. On the

other hand, the capability to shoot on the move (machine guns and conventional *152mm*) should not be forgotten. This capability suits the *A2* to an offensive role in either a fast moving, attacking force or employed on a "final dash" into some enemy position or objective area. Simply put, just keep in mind the unique characteristics of the tank and that it is still a tank and not solely an antitank or infantry support weapon.

After having read this far, a present or potential *A2* unit commander may have detected a challenge. It is that. He may wonder what people-resources he has or can expect to have to help him meet the challenge. Probably, the answer to that question is: the same numbers and quality of tankers that he has now or has known in the past. Hopefully, he will have a better cut on the quality of turret mechanics that he receives or sends to *A2* turret school — but then he has usually needed at least more good turret mechanics than he had assigned to take care of his *M60A1s*. Also, he would no doubt have liked to have had a higher percentage of truly professional tankers in his *A1s*. The point is this: we must strive to upgrade the professionalism of all of our tankers and maintenance personnel regardless of what kind of tank they are working with. A professional tanker has very detailed technical understanding of the subsystems within his tank, appreciates and takes loving care of these subsystems and has the confident ability to outshoot anybody around. The introduction of the *M60A2* and, before long, the *M60A3*, simply accent the imperative to improve our professionalism. Some Army-wide personnel management changes might be made to help with this process, but the motivation to excel remains always in the hands of the platoon leaders, and company and battalion commanders, in that order of importance.



LTC VERNON E. EBERT was commissioned in Armor upon graduation from the United States Military Academy in 1956. He commanded a tank company in Korea and served as an exchange officer to the French Army. Colonel Ebert is presently attending the Industrial College of the Armed Forces.



Several inches of old snow partially covered the ground which had thawed for a week in the area near Parsberg, Germany. On this morning in early February 1961, the scout squad, mounted in *M38A1* jeeps, was moving northward along a farm track while screening the battalion's front during advance to contact in Exercise Wintershield II.

As the squad passed a wooded area, it was suddenly ambushed at point-blank range by aggressor infantrymen. In attempting to escape, the two jeeps wheeled left into an open field. "HOLY SMOKE!" From my overwatch position I stared, horror-struck, as the two jeep crews, mired down in the field, were overrun and captured by the footmobile infantrymen!

The situation was tactically unrealistic, and the opposing umpires nullified the action. Still, I came away with a lasting prejudice against wheeled reconnaissance vehicles. I determined to be forevermore a prime proponent of the tracked recon vehicle.

By 1971 I was back in Germany commanding a tank battalion whose scout platoon was equipped with nine *M114A1E1*s. Almost immediately I lost my ten-year bias for tracked reconnaissance vehicles. A more damnable machine has never been approved for tactical use! The vehicle's highway speed was such that the scouts were hard pressed to post the way for the tank column, and its poor mobility characteristics limited its value in performance of cross-country recon missions. But the prime gripe was that the critter was so mechanically un-

reliable we could neither depend on it to complete its present mission, nor be ready for the next one. The best thing said about the *M114* among its users in Germany was that the vehicle certainly developed one's appreciation for detente!

For some time I pondered these bitter experiences with both wheels and tracks. As a lieutenant, I had long ago decided that wheeled recon vehicles are dangerous to one's health, and now I was certain that tracks were just as bad. My thinking rambled on . . . If neither the wheel nor the track could do the job of ground reconnaissance, maybe we had a case of, "you just can't get there from here." Yet the alternative of total reliance on air scouts seemed just as unsavory. It was sometime later that I realized I'd fallen into the trap that snares so many recon folks: making generalized indictments of an entire class of vehicles based on a sour experience with a particular representative of the class. Sweeping condemnations of the mission effectiveness, mobility, maintenance implications, et al . . . of either class of vehicles *in general* make interesting arguments at the Officers' Club Bar, but do little to solve Armor's problem of where to spend my hard-earned tax dollars.

Therein lies the purpose of this article: to air excerpts of service test reports on several reconnaissance vehicles (none of which have been adopted by the US Army) so that you may form better conclusions than I did about the relative characteristics of *specific* wheeled and tracked recon vehicles.

M113½

(Lynx)

Since 1965 the US Army Armor and Engineer Board at Fort Knox has tested several vehicles which have reconnaissance and security applications. The earliest of these was a military potential test conducted in late 1965 on the Command and Reconnaissance (C&R) Vehicle. This nine-ton tracked vehicle had a high percentage of parts interchangeability with the *M113* APC, and was therefore more commonly known as the *M113½*. The specific purpose of the Board's 1965 test was "to determine the military potential of the test vehicle compared to the *M113A1* personnel carrier in the command and reconnaissance role . . ." The *M113½* completed 2,895 test miles while experiencing six failures — three in the suspension system and three automotive. The test report summary concludes, "The test vehicles provided greater cruising range, fuel economy, firepower and automotive performance than the *M113A1* comparison vehicle . . . It was concluded that the Command and Reconnaissance vehicle with the *M74B* cupola (twin .30 caliber MGs) was superior to the modified (ACAV) *M113A1* APC for use in the C & R role."

Three items are worthy of note in regard to the test and the *M113½*:

- Though not stated in the report, the author infers that the modified APC (ACAV), instead of the *M114A1*, was selected as the comparison item because the latter had already been found inadequate for operations in the Republic of Vietnam.
- The test report was devoid of maintenance indices. Such were just beginning to be recognized and recorded in primitive fashion by early 1966; the idea not being fully exploited in service testing until 1971.
- The *M113½* is in use today as a reconnaissance vehicle in the Canadian and Dutch Armies.



M113½
(Lynx)



XM706

(Commando)

By mid-1965 the Army had also become interested in the possibilities of the *XM706* for use in reconnaissance and convoy escort roles. Aside from the mission performance capabilities of this seven-and-one-half-ton, four-wheel vehicle, the manufacturer purported that the incorporation into its design of several off-the-shelf components and assemblies (the axle assemblies were from the *M35*, two-and-a-half-ton truck) would ease the parts supply and maintenance burden in the using units.

The Armor and Engineer Board conducted the service test of the *XM706* during the latter part of 1965 "to determine (the vehicle's) durability, reliability and maintainability over 10,000 miles." The vehicle experienced 22 axle and suspension failures during the test, and its 0.64 man-hours of maintenance required for each hour of operation doubled the essential criteria of 0.30 man-hours or less. The final report of test stated, "Criteria specified in the proposed qualitative materiel requirement were met except in the areas of . . . durability, reliability, and maintainability . . . It was concluded that: the vehicle failed to meet several essential requirements and is unsuitable for Army use . . ."

By August 1967 the Board had concluded its third test of the *XM706*, this one being to evaluate a redesigned suspension system. The test was planned for 10,000 miles, but was terminated after 6,331. The final report concluded that "the modified suspension components were (also) unsuitable as to durability and reliability."

As a postscript it is interesting to note that the *XM706* is still used extensively by ARVN forces, though mainly in a convoy escort role. Since 1967 the manufacturer has beefed up the suspension, primarily by going to five-ton truck components and is presently enjoying a very profitable market overseas.



XM808
(Twister)

XM808 (Twister)

The *XM808*, a very interesting but complex system, was an 8x8 wheeled, fully-articulated vehicle consisting of two individually powered units interconnected by a pivot-yoke structure. The interconnecting structure provided pitch articulation of the forward unit, and relative yaw and roll articulation between the two units. The four wheels of the forward body were individually sprung while those of the rear body were mounted on powered walking beams. Steering was accomplished by powerful yaw movement between the two units in coordination with conventional front axle steering.

The *XM808* concept was originated by a commercial firm, which built one test rig and demonstrated its capabilities to the Army. As a result the Army procured two mobility test rigs and one combat configured version. The military version underwent service testing at the Armor and Engineer Board from July 1970 through April 1971.

The service test objective was to determine the military potential of the *XM808* from the standpoint of mobility relative to the *M114A1E1*, *M151A1*, *M561* (*Gamma Goat*), *M656* (five-ton truck), and the *XM706*; and to determine its dura-

bility, reliability and maintainability. The *XM808* proved to be faster on the road than any comparison vehicle and could stop quicker from over 30mph. It was also more maneuverable on the road than any except the quarter-ton truck. In cross-country operations in *dry terrain* the *XM808* again went faster, with less crew discomfort and more apparent stability, than any of the comparison vehicles. Only in deep mud obstacles (12 inches and deeper) were the *M113A1* and even the *M551* more mobile. They were able to negotiate mud which stopped the *XM808*.

As can be seen in the accompanying photo, the *XM808's* length (18 feet) and configuration seriously detracted from its worth in a reconnaissance role. The closed-hatch, close-in field of view of the commander/gunner was approximately 25 feet in all directions except to the rear. In a 30-degree fan to the rear, the close-in field of view was in excess of 50 feet. Both the driver and the observer had close-in fields of view of approximately 30 feet to the front, but neither could see to the rear.

The *XM808's* reliability was assessed over 9,561 test miles (488.73 operating hours). The vehicle experienced 87 failures, 36 of which were associated with tires and wheels. Mean miles between

failures (MMBF) was 109.9; MTBF was 5.61 hours. The maintenance ratio was 2.54 man-hours of maintenance for each hour of operation. The weight (21,700 lbs) resulted in wheel loadings which contributed both to the degraded performance in soft soils and to its poor reliability. The high mean time to repair (9.77 hours per maintenance action) indicated the vehicle was too complex. The final report of service testing concluded that in its present configuration the XM808 did not have military application.

Since 1971 the manufacturer has produced a prototype six-wheeled, articulated reconnaissance vehicle which draws extensively on the experience gained through the XM808 program.

XR311 (Dune Buggy)

Between January and April 1972 the Board, in conjunction with the former CDC Armor Agency, tested the XR311 High Mobility Vehicle. The Military Potential Test (MPT) encompassed four vehicles and 10,701 miles of testing in a mission pro-

file which included primary and secondary roads and cross-country operations. One test vehicle was equipped with a TOW missile system, and the other three mounted M2 .50 caliber machine guns. One of the machine gun vehicles was further equipped with a light armor plate to afford a degree of crew protection from small arms fire. The test developed data on the vehicle's physical performance characteristics as well as concerning its tactical employment and performance in the role of a reconnaissance vehicle.

During testing this three-ton vehicle demonstrated a dramatic capability in the reconnaissance role, its primary advantages being cross-country as well as highway mobility and favorable aural and visual signatures. Test personnel stated that the XR311s paid a high price for their cross-country mobility during the test. Numerous breakdowns (mostly suspension) were not considered in the mission performance evaluation, but were recorded and analyzed within the context of a reliability/availability/maintainability (RAM) evaluation. The test report states, "Unless they are corrected, the breakdowns

**XR311
(Dune Buggy)**



would negate all the positive (performance) attributes of the vehicle." One hundred and fourteen chargeable system failures were experienced during the test; MMBF was 93.87. Sixty-six of the 114 failures had to do with suspension and driveline components (eight rear differentials, 22 axles, 17 wheel bearings, five shock absorbers, and 14 steering system failures). The maintenance ratio was 1.14 man-hours of maintenance for each hour of operation, and the mean time to repair was 1.0 man-hour.

The test report concluded that the *XR311* does possess military potential for limited employment in the reconnaissance role, and that the benefits of employing the vehicle in a limited reconnaissance role outweigh its burdens. (The latter conclusion was made contingent upon the manufacturer's correction of the vehicle's reliability deficiencies).

Since completion of the MPT the manufacturer has produced a second generation vehicle which he claims is free of the suspension problems exposed during testing. This second generation prototype is presently being looked at by Project MASSTER at Fort Hood.

CONCLUSION

It is difficult to make across-the-board comparisons of the test data on these four vehicles, since the earlier tests (*M113½* and *XM706*) were restricted to soldier-operators testing only the physical and performance characteristics against the criteria parameters of the requirements documents. These included cruising range, side slope operations, durability, and performance of maintenance. Since 1971 the Board, in some cases (including those of the *XM808* and *XR311*) has conducted more comprehensive evaluations of selected test items. These total system evaluations included functional field testing to determine a system's total capability in certain functional areas such as reconnaissance performance, vulnerability/survivability, armament system performance and others.

The second major difference in test data has to do with the degree to which maintainability characteristics of the test item were quantified and recorded. Prior to 1966 (including the *M113½* test) maintainability data was almost exclusively qualitative except for the record of repair parts usage. Maintenance indices evolved slowly (and inconsistently) during the period 1966 to 1970. Since 1971, test reports (including those on the *XM808* and *XR311*) are fairly consistent in the reporting of standardized maintenance indices.

As goes the line in an old W. C. Fields movie, "The journey upon which we are about to embark is fraught with imminent peril." Having come this far with the study of the test reports, I feel it incumbent to draw some conclusions about the relative merits of the test vehicles. The rank orders in the accompanying chart are my own. They were arrived at subjectively, and I am the first to recognize them as argumentative. But, I submit, they are infinitely more objective than most of the wheels-versus-tracks arguments I've heard in the finest officers' clubs around the free world.

The *M113½* was best in *all around* mobility. Its average maximum safe highway speed (43mph) during testing was only adequate, but the vehicle possesses unusual speed, agility and stability across the spectrum of cross-country profiles. The *XR311* consistently made 70mph on flat paved roads and was somewhat quicker than the *M113½* across *level open* terrain, but this vehicle was much more prone to mission aborts in rough terrain, mud holes and sapling areas.

The *XR311* was in its element during recon performance where its mobility was enhanced by excellent crew visibility, and its very favorable visual and aural signatures made the vehicle extremely difficult to detect. Beyond the *XR311* the descending rank order in recon performance reflects primarily the drop off in capability to gather intelligence through observation and stealth.

The *XM808*, with its 20mm gun, powered cupola and applique armor, maximized staying power in performance of security missions. With its .50 caliber machine gun (not shown in the accompanying photo) the *M113½* possessed marginal firepower, and slightly less armor protection. Offsetting the latter was a relatively low silhouette to enhance the vehicle's survivability in security operations.

Crew and stowage arrangements were excellent in the *M113½*. The *XR311* had inadequate and awkward stowage locations, and the crewmen were exposed to weather and splashing mud and water during cross-country operations. Driver's controls in the *XM706* were poorly arranged and caused much consternation during operations; other crew stations were cramped and mutually interfering.

Reliability rankings support the contention for the use of subsystems already proven on other

"The XM808 . . . maximized staying power in performance of security missions."

RANK ORDER

<u>ALL AROUND MOBILITY</u>	<u>RECON PERFORM</u>	<u>SECURITY PERFORM</u>	<u>HUMAN FACTORS</u>	<u>RELIA- BILITY</u>	<u>MAINTAIN- ABILITY</u>
M113 1/2	XR311	XM808	M113 1/2	M113 1/2	XR311
XR311	M113 1/2	M113 1/2	XR311	XM706	XM706
XM808	XM706	XM706	XM706	XM808	M113 1/2
XM706	XM808	XR311	XM808	XR311	XM808

vehicles in *similar circumstances*. The difference in reliability between the *M113 1/2* and the *XM706* reflects the differential in their suspension system failures. The *M113 1/2*'s suspension had already been proven on the APC in a mission profile similar to that of the *M113 1/2*. The *XM706*'s suspension had previously been proven on the two-and-a-half-ton truck in a mission profile *totally unlike that of the XM706 in the recon role*.

Finally, the maintainability rankings reflect increasingly complex systems from first place through last.

In analyzing the chart, I leave you to your own devices as far as determining the scoring weight to give each of the six categories. There are so many other considerations (cost, crew/mechanic training, etc.) that I hesitate to make *any* overall value judgment of these vehicles.

Hopefully, the recon vehicle argument will soon be academic anyway. The Army is presently in the process of an extensive search to acquire the best possible new recon vehicle for its cavalymen. In May 1974 the Armor and Engineer Board completed the Development Test I (service phase) of the *XM800 ARSV* (a wheeled candidate versus a tracked candidate, with each compared to the *M113A1 APC* as the standard item). The final report, which is no longer "Competitive Sensitive," concluded that the tracked ARSV was significantly more mobile than the *M113A1*, which was slightly more mobile than the wheeled candidate.

Next came the Armor Center's Force Development Test and Evaluation (FDTE) of almost a dozen potential scout vehicles, including the three from the previous DT I. This "User Test" was completed by late August. The results are still marked "Competitive Sensitive," and therefore cannot be alluded to here.

The third step in the process is a Cost and Operational Effectiveness Analysis (COEA) to be conducted by TRADOC, with assistance from the Army

Materiel System Analysis Agency, to identify cost-effective alternatives for the performance of the scout missions. This computer analysis will be concerned with alternative cavalry organizations and techniques of employment, as well as hardware systems—all compared in the context of various operational scenarios. Selected vehicles from the FDTE will be examined.

Whatever system emerges from the COEA as the Army's new scout vehicle, it's almost a sure bet to be significantly better than any of those discussed in this article.

1. Maintenance indices are statistical calculations used to describe the maintenance characteristics of a test item. Some of the more common indices are:

a. Mean time between maintenance

Clock hours of operation

(MTBM) = No. of sched. & unsched. maint. actions

b. Mean time to repair failures

Man-hours of maint. to repair failure

(MTTR) = No. of failures repaired

c. Maintenance ratio

(MR) = Man-hours of maintenance

Clock hours of veh. operations

d. Mean active maintenance downtime

Sched. & unsched. maint. man-hours

(M) = No. of sched. & unsched. maint. actions

e. A system *reliability* index, which is related to maintainability, is mean miles (or time) between failure

Miles (hours) of operation

(MMBF) = No. of failures experienced



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GUARD TANKS



by Lieutenant Colonel Raymond E. Bell Jr.

Guard tanks were the first American armor to draw blood in World War II. They fought at Baliuag, along the Agno River, at the Calumpit Bridge and on Bataan during the stubborn defense of the Phillippine Islands early in our war with Japan. General MacArthur had only two tank units available to him, the 192d and 194th Light Tank Battalions which had been organized from former divisional tank companies out of California, Illinois, Kentucky, Minnesota, Ohio and Wisconsin. These companies had become surplus when the infantry divisions were reorganized from a "square" to a "triangle" configuration. Rather than disband the units, the companies were placed in battalions and sent to the Philippines where they won four Presidential Unit Citations.

And if one takes a look further back into history, other examples of the combat participation of mounted troops of the Organized Militia are easy to find. Today, however, one has to be careful about how one connects the present with the past, because Guard tank units have a colorful and diverse past.

For instance, as tank lineage goes, the 1st Battalion, 210th Armor has an extremely short one. It was designated as such only in 1960. Its history, however, goes back to 1860 when it was organized as the 10th Regiment of Infantry, New York State Militia. The regiment, in turn, had as its nucleus three independent companies raised in Albany, New York — the Albany Zouave Cadets, the Washington Continentals and the Albany Scotch Light Infantry. Each of these organizations had their own distinctive uniforms which, after 1860 when a regimental uni-

form was adopted, were worn for company parades and social functions.

The 10th Regiment fought in the Civil War as the 177th Volunteers and in the Spanish-American War the battalion was incorporated into the 1st New York Volunteers which saw three months service in Hawaii. It became the 10th Regiment in 1905 again, but was redesignated the 51st Pioneer Infantry Regiment in 1918. Then in 1940 the number "10" was lost again as the regiment carried the designation of the 106th Infantry through World War II. After the war the regiment was reorganized as an automatic weapons air defense battalion and in 1960 it became the 1st Battalion of the 210th Armor.

On the other hand, the six tank battalions of the 112th Armor of Texas' reborn 49th Armored Division trace their history back to the 1st Cavalry of the Texas National Guard organized on 3 December 1920. Less than one year later the regiment was redesignated as the 112th Cavalry and it was as this unit that it entered federal service on 18 November 1940. During World War II the regiment fought in the Pacific where it saw action on New Guinea, fought its way ashore on the Bismarck Archipelago, and won the Philippine Presidential Unit Citation on Leyte and Luzon.

After the war the regiment was broken up into armored cavalry (112th Mechanized Cavalry Reconnaissance Squadron) and tank (145th Tank Battalion) units. Then on 16 March 1959 a number of elements, to include those of the former regiment, were consolidated under the Combat Arms Regimental System and designated the 1st through the



4th Medium Tank Battalions and the 5th Reconnaissance Squadron, all of the 112th Armor. Today, there are six tank battalions of the 112th in the 49th Armored Division.

Such histories are unique features of most Army National Guard units. Indeed, it is not at all unusual for Guard units to be redesignated or reorganized frequently and troopers in some elements have been known to be qualified in every combat arm. But the lineage remains and the unit's history has special significance since it is, in fact, a "living" history. To understand why, one has to look at a unit's home station.

The main body of the 1st Battalion, 210th Armor is located in Albany, New York, in an armory built in 1923 for a troop of horse cavalry. There are stables for the horses, meeting and dressing rooms, a large kitchen, a special suite for the "general," carpeted offices and a large hall with a balcony and tankbark floors. The whole building can only be described as a "period piece," although the days of grandeur are obviously gone.

Today tanks are what it is all about in the armory and the balcony has been enclosed, locker rooms added, the stables turned into storage rooms and the tankbark has given way to a macadam floor.

Persian rugs, however, still grace the floor of the "General's Suite" and the colonel's office. The officers' club is filled with leather bound furniture and momentos of the recent past to include a case of models of armored fighting vehicles. Downstairs in the basement is the lavish Tiki Room where NCOs gather at social functions. The distant past is enshrined in the Cavalry Room which is resplendent

with battle trophies, portraits, group photographs from service on the Mexican border, horse trappings and other paraphernalia which preserves the history of all the organizations which were tenants in the armory.

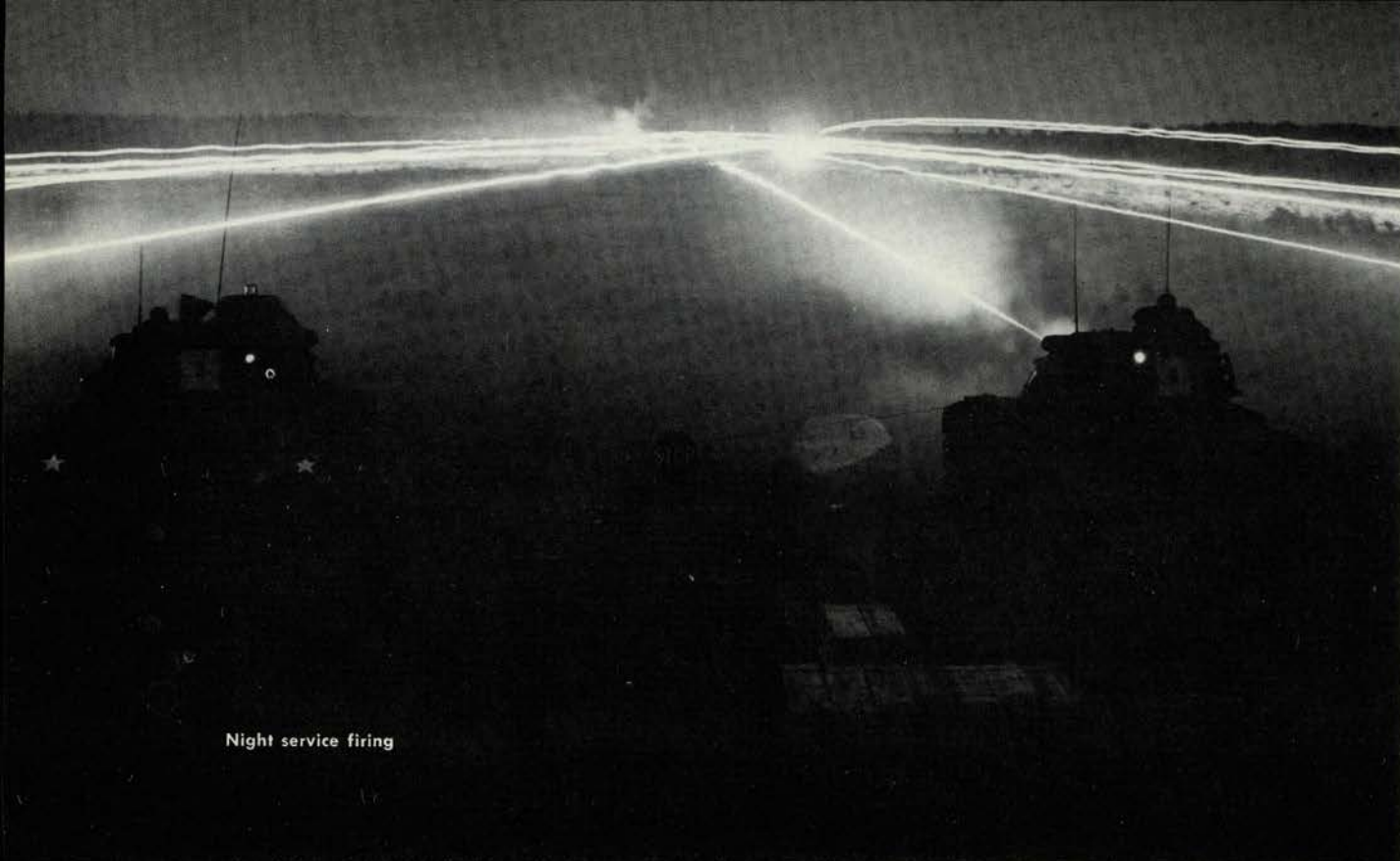
In other states, depending on how long units of an organized militia have been present, history is enshrined in various ways. Even where new armories have been built in the last few years, memorabilia representing unit accomplishments and history are appropriately displayed.

Today, there are 19 states which have Guard tank battalions in their military forces. Texas has the most with its six battalions of the 112th Armor. It is the only state with a complete armored division (the 49th) within its borders. New Jersey runs a close second with five battalions of the 102d Armor, three of which are in the 50th Armored Division and two which are non-division units. It also contains the headquarters of the 50th Armored Division which has elements in Vermont, New York and New Jersey.

For equipment the tank battalions have representatives of practically the entire gamut of tanks in their inventory beginning with the *M48A1*.

The highest priority tank units, those which help flesh out active Army divisions, have the most modern armored fighting vehicles at their disposal. On the other hand, units at the bottom of the readiness scale may train on the more modern versions, but basically they operate with the *M48A1*. Few of the battalions have their full complement of tanks at home station. Instead, National Guard equipment pools are spread throughout the nation. The California Army National Guard has an equipment pool at Fort Irwin, formerly an active Army post, but which today belongs to the State of California. New Jersey, New York and Vermont maintain equipment pools at Fort Drum, New York, from which tanks are drawn for weekend or annual training. New Jersey also has a weekend training equipment pool at Fort Dix where its combat troops train on weekends.

To keep the vehicles running, each tank battalion is supported by a small permanent force of mechanics, who, like in the Israeli Defense Force, keep the vehicles in shape for the weekend reservists who train on them. The mechanics are federal technicians which makes them civilians in uniform during the day and soldiers on drill nights. It is a fair judgment to say that these men are tops in their field. They are master mechanics who generally hold the rank of



Night service firing

E-5 or above as Guardsmen. They are part of the backbone of the Guard.

Training for the battalions is conducted at home station and at major training areas, just as it is in active Army units. But, whereas an active Army unit generally has at least limited close-in training areas at home station where companies can maneuver, most Guard battalions do not. The bulk of the training with vehicles has to be conducted at large installations, either state owned like Fort Irwin, permanent active Army posts like Fort Stewart, Georgia, or semi-active posts like Fort Drum, New York which only has a small active Army garrison. Although driving of tanks and firing sub-caliber practice can be accomplished at a large number of installations, service ammunition can be fired at relatively few, the aforementioned being three of the most prominent.

Fort Drum and Fort Irwin are old armored posts. The 4th Armored Division, in which the famous General Creighton W. Abrams commanded a battalion during World War II, was organized at Fort Drum in the early 1940s and there is plenty of open space over which to operate. On the west coast, Fort Irwin, where General Patton maneuvered his armored forces, has 577,076 acres suitable for all forms of maneuvers in a mountainous desert area. To Guardsmen, Fort Drum and Fort Irwin sometimes seem to be the end of the world. At Fort Irwin the temperatures range from the mid-twenties

in December and January to 110 degrees in July and August. But to any trooper who has served at Grafenwoehr, Hohenfels or Baumholder, Fort Drum is paradise. The bivouac areas even have grass on them. The barracks are nothing to talk about, but compared to the shelters at Aachen and Normandy at Graf, they are palaces.

Fort Irwin is the tank gunner's dream. It is reputed to have enough space on some of its ranges that a gunner can fire at a target in any direction. On the other hand, the brigade commander who wants to exercise his command can easily conduct a brigade size exercise within the reservation's boundaries. Fort Drum is laid out so that the maneuver areas, which are considerably smaller than those at Fort Irwin, can be easily reached from the cantonment area.

A visit to the training area reveals some interesting things, especially to an observer who has long served with active Army units. A good example involves the M48 tank's cupola with the side mounted .50 caliber machine gun. Experienced tankers usually have their own link chute in their pockets. The solid chute still seems to be preferred to the flexible one since the links are less likely to jam. The secret, however, is to have your special screwdriver available just in case the links begin to cause a jam. The National Guard tankers know this trick well, as experience has been a hard task master in this respect.

It must be remembered that Guardsmen live in



Guardsmen assisting in relocation of library

the community in which their unit is located and some Guardsmen have been tank commanders in the same tank for almost 20 years. Platoon Sergeant Anthony Taddio, a tanker for over 20 years and the Soldier of the Year of the 50th Armored Division lives in Dunkirk, New York where Company A, 1st Battalion, 127th Armor is also situated. There are many Sergeant Taddios in the outfit and they showed Army Readiness Region II's gunnery program assistance team as much when every tank from A Company which ran through Tables VIIA and VIIB qualified during Annual Training 1974. To be sure, a few full-time tankers were more knowledgeable following that performance.

On the other hand, training at home station can be a trying experience when you cannot get out in the tanks and many subjects must be taught over and over again every year. Guardsmen often complain that they have seen the same movie as many as six times and after the second showing they have really seen enough. Since there is no recognition of different levels of individual competence within the training program, an attitude of indifference is easily obtained. To combat this tendency, a commander must pay attention to his training which must be varied as well as competently presented. Within the confines of the schedules and administrative constraints, this can be a difficult task.

One way tank units have tried to beat this situation is to attempt to tie training to community action

projects. This takes a great deal of imagination and also very careful planning. In 1972, a good example of what can be done was undertaken by the 210th Armor at a local game farm. The farm management wanted to knock some buildings down and clear trails through densely wooded areas and the battalion was asked to help.

The mission offered a great deal of potential and it was surprising what missions for subordinate units were conceived. The scouts were charged with locating suitable tracks for trails which entailed examining slopes, stream beds and potential obstacles like rock outcroppings. The mortar men were assigned the task of surveying the area which required some imagination to adapt the use of fire control equipment to the accomplishment of the mission. The tanks were to clear the tracks and knock down the buildings while the transportation section hauled the building material away.

Guardsmen today are interested in becoming more involved in the community so the type of project involving the 210th has quite a bit of appeal. This type of project also appeals to Guardsmen who want to be gainfully employed on their weekend or week-day drills. It means extra work, however, for the very small, full time group of men who keep supply and administration current. On a typical battalion staff, for instance, the executive officer and S3 Air



may both be National Guard technicians who are federal civilian employees. In each company or separate detachment of a company there is at least one technician who handles the day to day administrative and logistical procedures.

It is interesting to note the membership of Guard units, not only tank units, but those in general. It often reveals an assemblage of highly qualified and motivated men. Battalion commanders may include executives from large companies like General Electric or IBM, professional men like lawyers or metallurgists, government employees like deputy budget directors or officers in large metropolitan police and fire departments and scores of others. Officers and non-commissioned officers may include bankers, architects, doctors and local businessmen. Graduates of the Army War College, Command and General Staff College, the career courses, the Sergeants Major Academy and numerous NCO courses are to be found. To be sure, many have done the work by correspondence or by attendance at USAR schools, but it must also be remembered that a great deal of motivation and time is required to accomplish many of the aforementioned courses.

If an attempt were made to differentiate between active Army tank battalions and Guard tank units, one has to consider the aspects discussed above. The history of many a tank battalion is, by the very nature of where it is located, different and may be much larger than an active Army unit. National Guard units see foreign duty and change of location infrequently. Unlike active Army units which remain in places like Korea and Germany for extended periods of time, National Guard units move only during a national emergency or the closing of an

armory. Training is also limited by location and by the very concept of the reserve system. And finally, except for a small full-time force, the Guard relies on a large part-time force to perform assigned missions.

The Guard's predecessors have, in all our major wars, responded to the call to arms. They have rallied when emergencies and disasters, large or small, have occurred. There is no doubt that they will respond in a like manner in any future time of need. The response will be tempered, however, by the limitations which are inherent to an organization that normally trains two weeks in the summer and one weekend a month. It is unrealistic to expect the Guard to respond as the reserves of an organization like the Israeli Defense Force can and it may even be unrealistic to expect the rapid response desired by the active Army. But the potential is there, as history records, and it remains to be properly exploited by those who understand what the Guard can, and cannot do. Let us only hope that the potential will never have to be realized again.



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THE GREAT WESTERN

by Henry N. Ferguson

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INFANTRY

HISTORICAL ESSAYS

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In the early days of World War II it was not uncommon to hear the recently organized Women's Army Corps referred to as the "freaks in khaki girdles." The patriotic young ladies didn't care much for this brand of publicity, but they could do little except grin and bear it.

Several wars ago, however, the mouthing of such an epithet would probably have precipitated the cracking of a few skulls. For the predecessor of the present-day female professional soldier was usually as tough and self-reliant as the troopers with whom she rode. One lady in particular set a rugged example for her modern counterparts to follow.

She first flashed across the pages of history in the late summer of 1845 in the military camp which General Zachary Taylor was establishing at Corpus Christi, Texas. The annexation of Texas had just been ratified, and the enraged Mexicans had announced that this act was tantamount to a declaration of war.

But nobody knew for certain just where the southern boundary of the Lone Star State was supposed to be. The Texans claimed it to be the Rio Grande, but the Mexicans insisted that it was the Nueces River which flowed into the Gulf of Mexico at Corpus Christi.

General Taylor, hoping for a peaceful adjustment of the dispute, but preparing for a fight if necessary, busily continued to assemble the largest concentration of regular troops since the Revolutionary War.

One morning a group of soldiers lounging in the sun were suddenly amazed to see a giant of a woman come striding along a company street of the 7th Infantry Regiment. As she passed, one of the men muttered something under his breath. With the litheness of a cat the Amazon whirled and, before the startled heckler knew what was happening, had hoisted him high against the side of a wooden building. Effortlessly, she held him there with one hand, her agate-blue eyes staring straight into his.

Finally the astonished soldier found his tongue. "I didn't mean no harm, ma'am," he stammered. "It won't happen again."

The woman's face was a mask. Suddenly she dropped her hand and the unhappy trooper plummeted back to earth. The woman turned abruptly and stalked away — she had not uttered a single word during the entire incident.

Thus was the Army introduced to one of the most colorful characters of the Southwest — a woman who was to become a legendary figure along the whole vast stretch of the Mexican border.

Sarah Borginnis, as she was known in those early days of her career, was one of those remarkable and tantalizing persons about whom history records only brief snapshot interludes — but a rough picture of her activities in the Mexican War and afterwards can be put together like a jigsaw puzzle with many of the pieces missing and a few not fitting in at all. She was a lusty woman who stood over six feet tall and was reputed to be able to lick any man of her size and weight in the Army; and who, under provocation, often did. Old Rip Ford, a one-time Texas Ranger and later a Forty-Niner, said she "had the reputation of being something of the roughest fighter on the Rio Grande; and was approached in a polite if not humble manner . . ."

Conversely, she was a motherly person who attained a semi-official status with General Taylor's army. But on occasion, she did become a formidable virago, while in battle she maintained a delicate balance between bravery and compassion and was much admired and respected by the men of Taylor's command.

Mrs. Borginnis — her husband was a 7th Infantry trooper — began her military service as a laundress, a profession which enabled a certain number of enlisted men's wives to accompany their husbands while on campaign.

Mrs. Borginnis, who had been born in Clay County, Missouri in 1812, had dark hair and grayish-blue eyes, and in spite of her size, was considered rather attractive. She soon became known throughout the ranks as "The Great Western," a nickname which probably derived from the huge steamer of that name — the largest in the world in the 1830s — and which was the second steam vessel to cross the Atlantic without help from sails. It is quite possible that Sarah resembled that ship under full steam.

In the spring of 1846, after negotiations for a peaceful boundary settlement had failed, Taylor broke camp and marched southward toward the Rio

Grande. Almost all the other women with the army were sent by sea to Point Isabel at the mouth of that river, as were the sick, among whom was The Great Western's husband. But she declared "the boys" of her mess — she was now cooking for the young officers of the 7th Infantry — needed somebody to take care of them. So, procuring a mule and cart, she packed her cooking utensils and supplies and drove her chuck wagon behind the marching troops across the desolate sand wastes of south Texas.

Taylor's forces halted at Arroyo, Colorado, a shallow stream 30 miles short of their destination. On the far bank, a small body of Mexican troops opened up with light gunfire, much shouting and many bugle calls.

The Great Western volunteered to cross the stream and clean out the guerrillas single-handed, and while General Taylor had little doubt of her ability to do just that, he elected to turn the chore over to General William Worth instead. When the skirmish was over, the army moved on to the Rio Grande, arriving on 28 March 1846.

Taylor immediately began constructing an earthen fort in a bend of the Rio Grande opposite the Mexican city of Matamoros. A month later, with the fort still unfinished, he left a small detachment there while he took the main body of his troops on to the Gulf to secure a base for seaborne supplies. Meanwhile, The Great Western had set up her mess for the officers of the detached group.

Two days later, at 0500 hours on Sunday, 3 May, the enemy began a heavy bombardment of the fort from their side of the river. The other American women with the command were rushed to the comparative safety of one of the underground magazines. But not The Great Western.

She was preparing breakfast when the firing started and she continued calmly about her business, with shells exploding on all sides. She served breakfast to all officers and then carried steaming coffee to the artillerymen who were engaged in returning the enemy fire. She also found time to feed and care for the other women, the sick and the wounded in the dugouts. Fortunately, only two Americans were killed — Major Brown, after whom the fort and the city of Brownsville were later named, and an enlisted man. But The Great Western had many narrow escapes as she stayed in the open and tended her fires; one shell splinter went through her sunbonnet, another knocked a tray from her hands.

No definite word came from General Taylor during this time and the situation soon became desperate.



The Mexicans kept up a daily bombardment, and the defenders could only hope that the overwhelming enemy forces would not make a general assault. The Great Western asked for a musket and ammunition and swore to defend herself to the end.

And then late one afternoon the thunderous roll of battle was heard to the north. Taylor was evidently fighting his way back from the beach. At sundown the distant firing ceased. Nobody in the fort slept that night. The Mexican bombardment began again the next morning with a stepped up tempo.

In the middle of the afternoon, the roar and rumble of artillery fire broke out once more to the north, but much nearer. At dusk a single horseman was seen riding furiously toward the fort, wildly waving a huge Texas hat and shouting at the top of his voice. He dashed across the drawbridge shouting "We've licked 'em! We've licked 'em all to smash!" The next day Taylor led his triumphant army back into the fort behind a band blowing and drumming "Yankee Doodle" as if their lives depended on the amount of noise produced to celebrate the victories at Palo Alto and Resaca de la Palma.

A couple of weeks later a delegation arrived from Louisiana to present a sword to General Zachary Taylor, and a dinner was given in honor of the visitors, during which many toasts were proposed and drunk. Then Lieutenant Braxton Bragg, an artillery-

man who had served inside Fort Brown during the bombardment and who would later become a general in the Confederate Army, rose to his feet. He proposed a toast to the "Heroine of Fort Brown." All jumped to their feet with tumultuous cheers to drink to The Great Western and to shatter their glasses against the walls.

There were newspaper correspondents at this banquet who sent home glowing accounts of the bravery of The Great Western. But fame is a fleeting thing, and no statue — or even a marker — to the memory of the Heroine of Fort Brown stands today on what is left of the ruined ramparts of that fort on the outskirts of Brownsville, Texas.

When Taylor carried the war onto Mexican soil, The Great Western rode with him. A woman of boundless energy and no little shrewdness, she even found time to go into business for herself in this alien land with which her country was at war.

Doctor A. Wislizneus, a German doctor with the American forces, wrote from Saltillo: "I stopped for some hours in the hotel of 'The Great Western' kept by the celebrated vivandiere, whose fearless behavior during the battle of Buena Vista was highly praised; she dressed many wounded soldiers on that day, and even carried them out of the thickest fighting."

Buena Vista was probably the most desperate and bloody engagement in which our army was engaged prior to the Civil War. It was a slam-bang, kaleidoscopic struggle, fought in a narrow mountain defile, and it was during the battle that another incident occurred which has become legend in the border country.

During the height of the struggle a troop of Mexican lancers put to rout a regiment of Indiana volunteers, chasing some of them into Saltillo. One of the retreating Indiana boys made straight for the hotel operated by The Great Western. Breathless, he burst into the combination bar and lobby where she was serving drinks.

"General Taylor has been whipped!" he gasped. "The army is all cut to pieces and the Mexicans are headed for Saltillo."

The Great Western lashed out with her fist and knocked the cringing soldier sprawling. "You damned coward," she snarled, "there ain't Mexicans enough in Mexico to whip old Taylor. You go on spreading that lie and I'll beat you to death!" And so ended that rumor.

Sarah Borginnis' husband seems to have disappeared sometime during the campaign, perhaps

killed in action. At any rate, the ubiquitous lady attached herself to a squadron of the 2d Dragoons, which was ordered in July 1849, after a treaty of peace, to California.

To acquire the official status necessary for her to accompany the men on this trek, The Great Western was obliged to marry one of the dragoons. She went about this with her customary forthrightness, riding along the front of the line and crying out, "Who wants a wife with fifteen thousand dollars, and the biggest leg in Mexico! Come, my beauties, don't all speak at once — who is the lucky man?" And as she also had the reputation of being an excellent cook, a dragoon quickly volunteered to act as her husband — without benefit of clergy.

But Mrs. Davis, as she was now known, did not reach California, for she became ill when the troops reached Chihuahua City and was left behind. After much suffering and hardship, she finally made her way to El Paso where she opened another hotel, catering to the Forty-Niners who were pouring through the town in a steady stream on their way to the gold fields on the west coast.

The Great Western eventually joined a party of these Forty-Niners and accompanied them as far west as Fort Yuma, a desolate and scorching Army post which had been established in 1850 on the California side of the Colorado River. Father Figueroa, a local priest in Yuma, mentions her in a manuscript as the first American woman to settle in Arizona City — later Yuma. Before long she married Albert J. Bowman, who was an upholsterer by trade.

The Great Western opened a restaurant in the raw settlement of Yuma and operated it until her death on 22 December 1866. She was buried, under the name of Mrs. Bowman-Phillips, with full military honors at Fort Yuma — the only woman ever to be interred in the post cemetery. Following the Mexican War she had been brevetted a colonel for her services and had been made a pensioner of the government on orders from General Winfield Scott.

In September 1890, all the bodies in the Fort Yuma cemetery were removed to the national cemetery at the Presidio in San Francisco and there The Great Western rests today under a headstone bearing the name "Sarah A. Bowman."

The death of this remarkable woman saw the end of an era — for after The Great Western's war, women were never again officially allowed to accompany their husbands into battle.

The US Army may be number one in speed, shock action and firepower, but when it comes to ROTC, we're dead last. Let's face it: we can recruit and revamp until the Mekong Delta dries up, but unless we are tuned in to the potential ROTC cadet we may as well forget it.

Colonel William D. Guinn, Professor of Military Science at the University of Tennessee, decided not to "forget it." He requested the help of the University's College of Communications to conduct a survey last June. A questionnaire mailed to a random sample of 300 male undergraduates brought 188 responses. The results revealed some insight into the thinking of the university man toward ROTC.

Even though Tennessee's rate of volunteering for the armed forces is among the nation's highest, the Army ROTC enrollment rate at the University of Tennessee has declined steadily since conversion to all-volunteer status — from 605 in 1971 to 459 in 1973. Army ROTC at UT wants to increase enrollment and in FY75 will spend approximately five times as much at UT Air Force ROTC, which does not need to recruit actively. WHY?

On the UT survey, young men were asked which program (Army, Air Force, Navy) of ROTC they would prefer to join. Only one out of 10 chose Army as first choice. A whopping 54.7 per cent chose the Air Force first. Navy ROTC had 34.14 per cent — not bad when you consider that Navy ROTC is not even represented on the UT campus. And Army comes in last with only 13.09 per cent. We're still slogging in the mud so far as the potential cadet is concerned. WHY?

The remainder of the study suggested some answers, but it should be noted that the results of the UT study may not hold true on other campuses. Tennessee is a conservative state, and the study should be repeated elsewhere for supportive data.

So what influences a young man at the University of Tennessee to join ROTC?

Slightly over 60 per cent of the respondents felt that "service as a commissioned officer in the armed forces compares very well with other career opportunities." Roughly one out of three undergraduates indicated they think about joining ROTC "sometimes" or "often." Still enlistments drop.

Money, in a lump sum, is a dubious inducement. Although 45.3 per cent agreed that a lump sum cash bonus of \$3000, payable at freshman registration, would prompt them to join and complete the ROTC program, the majority (54.6 per cent)

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disagreed or had no opinion at all. Age played a role here, however, for freshmen and sophomores, in higher numbers than upperclassmen, favored the idea of a lump sum bonus. Facing four years' expensive education, the freshman is amenable to financial persuasion.

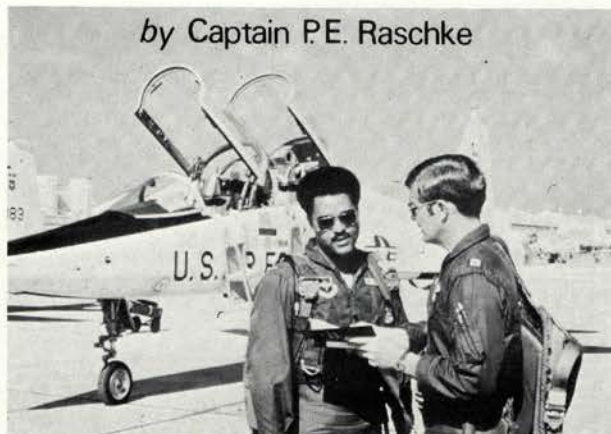
Less than half (44.3 per cent) of the respondents said passage of a draft law would cause them to volunteer for ROTC, but the majority of them were freshmen. Over one-third said the draft would not influence them to join ROTC. Clearly we cannot blame declining enrollments solely on conversion to all volunteer status, and again we have evidence that the freshman is more open to ROTC than is the upperclassman.

The UT survey found an almost even split on whether or not university-aged women have negative attitudes toward male participation in ROTC. The majority (79.8 per cent) agreed, however, that an individual's fiancée would have a strong influence on any decision he made concerning ROTC. We cannot afford to forget young women when we are talking to young men.

Can we say that young men are not joining ROTC simply because they don't know about it? Not at the University of Tennessee. Five questions on the survey homed in on specific knowledge, and the results showed the knowledge level was high. More than half knew the salary range for a second lieutenant. Almost 70 per cent knew that students enrolling in Military Science III and IV were paid

TC THEIRS?

by Captain P.E. Raschke



\$100 a month, and nearly 87 per cent knew they could obtain full tuition scholarships through ROTC. Over 87 per cent knew that ROTC courses could be taken for elective credit, and 66 per cent understood that basic summer camp did not obligate them to ROTC. The lower awareness level on summer camp might result from confusion between basic summer camp and the obligatory advanced camp. Information on the camp program perhaps needs clarification or emphasis.

Only about one out of 10 expressed a dissatisfaction with the amount of information available to him on ROTC. Students apparently obtain adequate information, but of what sort and from what source?

University of Tennessee men get their information on ROTC from their friends (27.9 per cent), pamphlets or brochures (26.2 per cent), and relatives (12 per cent). Television and high school counselors ranked fourth (9.3 per cent) and fifth (8.2 per cent).

These findings reinforce those of a Purdue University ROTC survey conducted in February 1974. Purdue cadets named brochures or pamphlets, parents or relatives, and high school counselors, in that order, as the source of their first information on ROTC. But the Purdue cadets thought the *best* way for ROTC information to be presented was by "visits by ROTC students or officials," "briefings or programs," and "pamphlets or brochures."

Several observations may be made. The UT sur-

vey used non-ROTC male undergraduates while Purdue used cadets from all three service programs. Purdue cadets suggested two types of personal contact as the best ways to learn about ROTC, and UT students showed more use of personal than impersonal sources of information. The message is clear. People make better carriers of information than impersonal approaches. Friends, parents and relatives are listened to, but our ability to influence these information links is limited. Another source who is listened to is the high school counselor, and here is a personal information source with whom ROTC can maintain direct contact. ROTC should interest itself regionally in gathering basic demographic information about them. Are counselors predominately young or old, male or female and do they have prior military experience or not? The results of these studies of their influence should be brought to their attention, and with proper knowledge and effort, their importance might be increased.

On the impersonal side, both surveys show a high reliance on and respect for pamphlets. It is easy to speculate why. They are colorful, quickly read, and easily fitted into a pocket for later use. In view of the high cost of other media and the relatively low cost of pamphlets, ROTC might profitably do more with the latter. More complete information, obtainable through research, could prove beneficial and economical. For instance, where do students get the pamphlets they read? Career counselors? Direct mail? ROTC booths at freshman orientation? Whose pamphlets are they getting — Army's, the Navy's or the Air Force's? And what do they look for in these pamphlets? What influences them?

We also need to ask ourselves if the information we disperse to potential cadets speaks to their predispositions. We must start from their attitudes toward ROTC in general, and the Army in particular. ROTC survived campus unrest over Vietnam and the draft, but maybe those were not the gut issues. We need to know what students care about, deep down. If it came to a choice, would ROTC go or stay?

An ambiguous question that would force the student to make a decision about the presence of ROTC on campus was included in the UT survey — sufficiently far along that the intent of the question would not be in doubt. Students were asked to agree or disagree with the statement, "I could vote for someone running for student body president who publicly advocates the removal of ROTC

from the campus." Although some respondents indicated the question was ambiguous and qualified their answers, there nevertheless appears to be a roughly two-to-one split in favor of retaining ROTC at the University of Tennessee. Further research to compare the Tennessee results with those obtained in other regions could be useful in tailoring recruitment techniques to specific area needs.

But having said that students favor retaining ROTC on campus by two-to-one — that deep down they are more pro than anti — are we talking about Army ROTC or somebody else's ROTC? The results indicate we are talking about somebody else's ROTC. As stated earlier, only 13 per cent chose Army ROTC first over Air Force or Navy. Any examination of their reasons, invited in free response, is revealing. Those who chose the Air Force as first choice show a marked preference for the wild blue yonder; almost one-third of them said they "wanted to fly." Ironically, one responded he wanted to join the Air Force to fly helicopters! So much for the dynamics of the Army ROTC flight programs.

Other responses also appear significant. Reasons listed under "good educational or career opportunities" found the Air Force first again (10.1 per cent). The Navy was second (9.8 per cent) and the Army last (8.7 per cent).

The Navy came in first with responses corresponding to "good travel opportunities." Apparently the old adage, "Join the Navy and see the world," is holding up. Those who chose Navy ROTC as first choice also expressed a fondness for the sea.

By contrast, the bulk of the comments about the Army were negative in nature: "Too regimented," "Attracts low caliber individuals," and "Sounds drab." Only one individual mentioned travel opportunities in connection with the Army; no one mentioned the Army in connection with leadership or personal challenge.

Attitudes come more sharply into focus over what is most disliked about ROTC. Military obligation after completion, regimentation and loss of individuality and uniform or haircut requirements were named most frequently. It is interesting to compare the relative importance of the expressed dislikes with the expressed likes. In listing the most important thing ROTC does for an individual, over 27 per cent said ROTC gave good preparation for military service. About 17 per cent said ROTC "helps an individual become more mature and

self-disciplined." Slightly over one in ten thought financial aid was most important.

Of the total, four per cent thought ROTC did *nothing* for the individual. This group also thought service as a commissioned officer did not compare well with other career opportunities. They tended to believe women held negative views toward male participation in ROTC, and they had an overall lower knowledge level concerning ROTC.

Well, where do we stand? Should we give serious consideration to forming a National Guard or Army Reserve ROTC sequence to placate the dislikes of an active duty obligation? Or do we need to concentrate on the immediate needs of freshman students? Obviously the answer is not clear and we must interpret the above data with care. Replication of this survey should be considered, because the results would be helpful in determining an overall ROTC program and tailoring programs to the needs of specific areas. For example, if research shows most freshman students in the Pacific Northwest have both favorable attitudes toward ROTC and a high interest in outdoor activities, then a regional effort to emphasize the challenges of Ranger training might stimulate interest in Army ROTC.

The point is, let's do more market research! A well-designed research program, replicated nationally every two years, would provide sufficient trend data to analyze gradual changes in such important areas as attitudes and knowledge. Regional peculiarities could also be coped with, once identified. Such research, properly used, could enhance the Army's image and allow us to avoid the trap of continuing programs merely because they have proved successful in the past. It could eventually eliminate the need for the question — "ROTC: Ours or Theirs?"

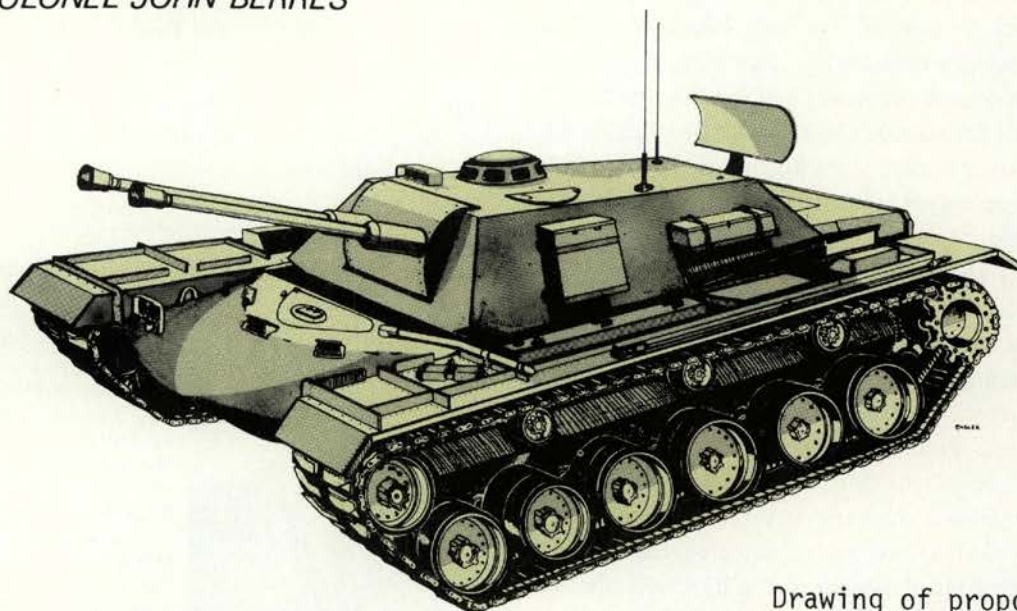


CPT P. E. RASHKE is a 1973 graduate of the Armor Officer Advanced Course. He is currently completing requirements for a master's degree in Communications at the University of Tennessee.

short! over! lost! OR...TARGET ⊕

Antiaircraft/Anti-Antitank Missile

by COLONEL JOHN BERRES



Drawing of proposed vehicle.

The US Army is rapidly becoming the only major army in the world in which enemy ground targets at ranges between 2,000-3,000 meters cannot be engaged by direct fire guns other than the main tank gun, and in which armor-protected air defense cannons cannot be employed fully forward in the battle area to fire in excess of 2,000 meters. In the ground target area this may appear to be a long battlefield range for some parts of the world; however, we have recently seen wire-guided antitank missiles engaging armored vehicles up to 3,000 meters in the Sinai. The Israeli tankers, with their main guns, were credited with hitting some of these missile positions or the thin-skinned armored vehicles on which the missiles were mounted. I'm not suggesting that any weapon that can destroy a tank isn't a good main gun target, but I do feel that this role can be properly shared in view of the limited number of suitable main gun rounds carried aboard our tanks.

The USSR has developed an anti-aircraft tank mounting four 23mm guns capable of engaging ground and aerial targets up to 3,000 meters. The Federal Republic of Germany has recently developed and tested an anti-aircraft tank, using the *Leopard I*

chassis, employing twin 35mm guns capable of firing and hitting ground and aerial targets in excess of 3,000 meters. The French have done the same with twin 30mm guns on an *AMX30* chassis, and the British are thinking about it. We have nothing in the active Army to compare with the mentioned systems.

Our best competitor, the *Vulcan*, although capable of a gluttonous rate of fire, is short ranged, somewhere under 2,000 meters. Our .50 caliber machine gun possesses a similar maximum effective range.

A most serious new threat to armored forces appears to be the antitank missile, whether ground mounted or fired from helicopters. In both cases, since several of these missile systems can be fired from out to 3,000 meters, we have a gap in our capabilities to engage them with guns other than the main tank gun. Of course, one might counter by saying artillery can be adjusted on these targets, but this may well prove too slow a response if our side is in the open.

One must ask oneself, why are the Soviets, the West Germans, the French and possibly the British employing 3,000 meter radar guided automatic can-

non on antiaircraft tanks? Is it to counter a helicopter threat? Is it to counter a ground-mounted antitank missile threat? I suggest that both questions might well be answered in the affirmative, aside from the employment of these weapons against high-performance attacking aircraft.

Up until recently, the US Army found the twin 40mm *Duster* system very useful, albeit in the ground target role. Yet when the wars ended, both in Korea and in South Vietnam, the *Duster* was turned back to pasture. Its twin 40mm *Bofors*, although lacking a modern fire control system, have a tracer burnout of between 3,400-3,900 meters. In other words the rounds can be sensed to these ranges with a modern optical sight or guided there by radar fixes. Air defenders, outside of their *Vulcan* contribution, appear to have become totally enraptured by the aircraft-killing missile with a resultant lack of dual purpose capability in these missile systems; that is, the attack of air and ground targets.

I am suggesting as an interim then, that we consider resurrection of the *Duster* system once more, but this time mounted on the chassis of the *M60* tank, or a dieselized *M48*, since both are capable of moving anywhere cross-country that tanks can normally go. Add a new fully protected turret and a modern fire control system to the hull, include both acquisition and search radars and the vehicle is complete. This weapon system could be handily inte-

grated well forward into armor formations, enjoy a similar condition of armor protection, engage enemy aircraft and ground targets with equal ease, and specifically, provide a quick reaction firing capability, or provide reconnaissance by fire, against enemy antitank missile systems or suspected locations. Commonalty of track, hull and power pack componentry would also be realized. In the long run, perhaps *Bushmaster*, in a multi-barrel configuration, could eventually replace the 40mm guns.

We then will have the best of both worlds and do not have to push the state of the art by asking the tank to perform a 3,000-meter antiaircraft mission or to concentrate the majority of its attention on enemy missileers.



COL JOHN P. BERRES was commissioned in 1949 after enlisted service with the Infantry during World War II. Colonel Berres was a company commander in the Korean War and has commanded battalions in Europe and Vietnam. A 1970 graduate of the Army War College, he served as Commander of the 2d Advanced Individual Training Brigade at Fort Knox and is currently president of the US Army Armor and Engineer Board.

KETTENKRAD

A reader recently wrote in that a tricycle type motorcycle similar to what many city police departments use might be a feasible reconnaissance vehicle. It would carry a larger payload than the standard off road bike and be more stable than the sidecar configuration.

I could not help but be reminded of the German *Kleines Kettenkrad* used extensively during World War II. It was in simplest terms a motorcycle with tracks or half-tracked. Weighing around 2,500 pounds it would maintain 40 miles an hour on the road and could tow over four tons.

The *Kettenkrad* as it was called, was introduced in 1941 when airdropped during the German parachute raids on Crete. Later this hybrid vehicle was used as an antitank gun tractor, a communication line layer and replaced motorcycles in reconnaissance and liaison roles. Its mobility in mud and snow was excellent. By the end of 1941, production figures had exceeded 8,000.

I assume that today the *Kettenkrad* would demand the right of way during a motocross.

Ed.



FROM THE **ARMOR BRANCH CHIEF**

COL JOHN R. BYERS



Some Words of Advice on OERs

We recently ran a short survey of the time lag in handling your OERs. Our concern is that a particular report may be crucial to an officer's selection for promotion or military schooling, but might be unduly delayed by processing. So we looked at a random sample to find just where time was being used.

As you know, AR 623-105 requires that reports be prepared and forwarded to DA so that they will arrive within 45 days of the end of the reporting period.

We found that, in our sample, the average time taken by the rater to write his portion was 28 days. The endorser took five more days, and the reviewer used another six days. The average time lost in processing and mailing (from the reviewer to arrival in MILPERCEN) was 52 days. That's a total of 91 days! We offer this to you raters, endorsers and reviewers out there as a not so subtle hint that we all need to do much better for our troops.

Now we get a number of questions on every field trip about the 67-7 report. What's a good report? What's the average now for lieutenant colonels (majors, captains and lieutenants)? If I rate an officer in such-and-such a manner, will it hurt or help him? And so on.

AR 623-105 is fairly explicit on how officers should be rated, but we're all aware that the system has been somewhat skewed. We don't know what the current averages are because we don't make any attempt to collect that kind of information. Even if we did know, we're not sure that publishing such information would be beneficial; it might only add more fuel to inflating reports as raters try to beat the average. What's a good report? Probably one that you'd consider an honest appraisal if you were receiving the report instead of writing it. We do have some words of advice on writing reports.

First, keep them brief. The very best ones are

rarely more than three or four lines long, and you don't have to have an MA in English to write that kind of report. Avoid describing the officer's duties. The feedback we're getting from selection boards is that this is the greatest failing of raters — lengthy, detailed job descriptions that have nothing to do with the man's performance, but the boards have to read it all. Instead, emphasize positively how he performed and what he accomplished.

Next, be sure to use Part IV, "Professional Attributes" not only to indicate areas where improvement is needed, should this be warranted, but more so to point out particular strengths. Too many times there are no entries at all in this section.

Finally, be honest. If you're rating a really super officer (one so great you'd happily serve under him were he promoted two grades tomorrow!), then be sure that any board reading that report five years from now will clearly understand how fine that man is. So our advice is: be succinct, stay to the point, use the whole report, be positive and be fair.

The First OER

How significant is a lieutenant's first evaluation report? Is it viewed as a "grace" period, where consideration is given for his transition into the military environment? Is it used as the measure of his future potential solidifying his specific advancement potential? In point of fact, it is neither.

OPMS and DA Form 67-7 make correct evaluation reporting procedure more critical than ever; and for the second lieutenant just leaving his starting blocks, this point is further reinforced.

Two key thoughts are appropriate:

SPECIFIC: An initial report plagued with generalities benefits neither the Army nor the rated officer. Identification of precise strong points is just as important for the new officer as speci-

fying weaknesses, should the weakness justify comment.

FAIR: Overemphasis must be curtailed in both directions. The young officer deserves, and will appreciate, a true and accurate description of his performance.

All evaluation reports are vital in career progression, but the first report can have more impact on the young officer than any other. It must not be used as a counseling tool, it must reflect the effects of prior counseling. Make it a solid measure of the man.

Forwarding Unofficial Copies of OERs

There is only one official copy of your OER, the original, and that is the only one which may be filed in your Official Military Personnel File (OMPF), and presented to selection boards. The official copy must be forwarded direct to MILPER-CEN and will be filed in your OMPF, and a copy in the Branch file, only after the OER has been properly screened. You can be assured every effort is made to complete the screening process as rapidly as possible. If an officer's OMPF is already before a DA board when his new report is received, the new report is automatically forwarded to the board for consideration.

Senior Service College Non-Resident Instruction

Armor officers interested in the Army War College Non-Resident Course should review AR 351-11. To be considered for selection, applications must be submitted by 1 April 1975. Applications received after that date will be filed and sent before the selection board for consideration the following year. Selection for the Non-Resident Course does not preclude selection for resident schooling.

Assignment Policies

With the reduction in short tour requirements, we find increased emphasis on personnel stability in assignments. Here is a summary of several policies related to assignment stability that may assist you in your planning:

- Except for short tour areas, tenure for battalion commanders is normally 18 months; company commanders should expect 12 as the standard.
- CONUS is the sustained base for overseas personnel requirements. Involuntary intertheater

transfers will be treated as exceptions to policy and will be made only as a last resort to meet short tour requirements equitably.

- Officers assigned to long tour areas overseas will normally be expected to complete the prescribed tour.

- Officers who voluntarily extend in long tour areas overseas and complete four years or more in the long tour area may, upon completion of the long tour, be assigned directly to a short tour area without an intervening CONUS tour, if necessary to meet short tour requirements equitably. We don't expect this to become normal practice, however.

- Our stabilization goal for officers reassigned to CONUS from overseas is two-and-a-half years in CONUS before you are subject to being involuntarily reassigned to another overseas area. Generally, our goal for CONUS assignments is three years and we won't move you then unless a valid requirement exists.

Assignment to Training Centers

We are providing high quality officers of all grades to the training centers. Colonels recommended for command of training brigades are senior service college graduates, and lieutenant colonels recommended for command of training battalions are graduates of the Command and General Staff College and after July 1975 will be selected by the DA Command Selection Board. We also assign only fully qualified, career-oriented captains to the training centers consistent with Army-wide priority requirements, individual career development needs and personal desires.

The fact is that Department of the Army policy pertaining to command and command equivalent duty is established by AR 624-100, in operating instructions for the Officer Personnel Directorate, and in letters of instruction to Army Promotion Selection Boards. That policy provides that command in training centers, and of posts, Army confinement facilities, hospitals, installations and similar organizations will be considered the same as other command duty.

We need the very best leaders and trainers in our training centers. Our new soldiers receive their initiation to Army life there just as many of us did, and that initial impression will be a lasting one. If we're going to provide well trained troops to our TOE units and retain those troops later, it's essential that we give them the best leaders possible right

from the start. Now Armor captains are in heavy demand in the training centers, so many of our officers can expect assignments to Forts Knox, Jackson, Leonard Wood and Dix. This is particularly true of officers completing a normal tour in USAREUR. The experience they've gained from Armor duty in Germany is much needed in the training centers, and they represent one of our primary sources of input to the centers. There are no easy jobs in the centers; they're tough and challenging, but they're also very rewarding and extremely important.

Armor Officer Advanced Course (AOAC)

Branch is screening captains' files for prospective attendees at the FY 76 AOAC beginning in September 1975. Our objective is that career officers attend the advanced course as soon as practicable after completing four years of commissioned service. Our overall goal is to insure that each officer has attended or is in attendance prior to the completion of his eighth year of commissioned service. Projections for FY 76 are for schooling of approximately 300 captains — 250 at the Armor Advanced Course and 50 at the Infantry and Marine Advanced Courses.

The paramount consideration for selection are factors such as assignment availability, branch qualifying assignments, remaining years of eligibility, officer's preference and stabilization. Final selection for attendance is based on a combination of all these factors. Assignments for the FY 76 advanced courses are scheduled to be completed by January 1975.

Officers who will complete four years of commissioned service as of September 1975 may contact Branch at any time to ascertain which course you are projected to attend.

Assigned to USAREUR (A repeat by popular demand)

All officers assigned to Europe are initially assigned to the 21st Replacement Battalion, USAREUR. This assignment is for administrative purposes only and has nothing to do with your ultimate assignment. If you desire a specific unit or locality in Europe, write to the Armor Assignment Officer at HQ USAREUR. Every effort will be made to accommodate your personal desires consistent with your qualifications and the requirements of USAREUR. In writing you should include a copy of your orders and DA Form 3922 (Military Spon-

sor Program Information). Address your letter to:

Commander
US Army MILPERCENEUR
ATTN: AEUPE-OA
APO New York 09081

Approximately 150 days before the month of your arrival in USAREUR, your initial assignment to one of the major subordinate commands will be made. If you have expressed your desire for a particular assignment, this information along with your sponsorship form will be passed to the gaining command. The subordinate command then determines your ultimate assignment. The USAREUR goal is to have your specific assignment not later than 120 days prior to your arrival in USAREUR. This procedure applies for all company grade officers, majors and lieutenant colonels. The ultimate assignment by USAREUR is planned to occur in sufficient time for your losing command to amend your orders and allow you to make whatever personal plans that may be required.

If you desire concurrent travel, you should apply through your local transportation office as soon as you receive a copy of the orders assigning you to the 21st Replacement Battalion. This should insure that a copy of your request is on file with the USAREUR concurrent travel section at the time that your ultimate assignment is determined. USAREUR can then make a prompt decision on the availability of government quarters. You will normally receive your concurrent travel instructions, if approved, about 60 days prior to arrival. If government quarters are not available, then your sponsor becomes the key to concurrent travel. The DA Form 3922 which you forwarded plus your personal contact with your sponsor will enable him to assist you in obtaining economy quarters.

Officer Assignment Preference Statement

This is our way of learning what your desires are and serves as a vital planning tool in making your assignment, recognizing that assignments are made to attain a proper balance between professional development of the officer corps and meeting Army requirements. It's quite possible to satisfy both the needs of the Army and your desires.

Make sure you put your complete present mailing address in item 8(a); and, if in CONUS, don't forget your telephone number.

Do you want a particular type job? Is there some special school or location you want? Tell us so.

If your last preference statement is more than a year old, if you don't have one on file at all, or if some major changes have occurred in your life send us a new preference statement. You say the form doesn't fit your needs? Send us a letter! But let us know what you want.

Officer Requisitioning and Assignment

MILPERCEN determines, normally on a semi-annual basis, a Projected Requisition Authority (PRA) for the major commands. As defined in AR 614-185, the PRA is a single source document which allocates officers by branch and grade to major commands and activities in accordance with established priorities and approved authorizations, and provides the basis for validation of requisitions. The PRA fluctuates because it is tied to variables such as the force structure, Army end strength and priority of the command.

Major commands and installations submit personnel requisitions to DA based upon the grade and branch limitations contained in the PRA. MILPERCEN in turn, validates those requisitions which are within the limits of the PRA, and forwards them to the various career branches. Each branch is responsible for filling validated requirements on time with the best qualified officers available. Unfortunately, there are not enough officers available to fill all TDA/TOE positions worldwide. The PRA provides for an equitable distribution of the Army's officer shortages to major commands in accordance with the DA Master Priority List priorities.

The distribution of these shortages in the field, and hence allocation of officers within a command, is done essentially at the discretion of the major commanders concerned. Branch assignments are normally made to major command level for overseas and to installation level in CONUS. Branch may recommend utilization of an officer based upon his experience, interest and professional development needs, but cannot direct such utilization or assignment and current command requirements take precedence. Officers should be aware of the assignments needed for professional development, and seek those jobs when requirements are not over-riding. If you have any doubt regarding the type of assignment needed, please call Branch and we'll be happy to discuss the subject with you.

ARMOR BRANCH CHIEF

COL John R. Byers 325-7831

ASSIGNMENT SECTION

LTC John M. Toolson
(Deputy Branch Chief) 325-7833
LTC William F. Streeter
(LTC Assignments) 325-7835
MAJ Fred W. Greene
(MAJ Assignments) 325-7835
LTC Rodney D. Wolfe
(Aviator Assignments) 325-7839
MAJ Hilbert Chole
(CPT Assignments) 325-7841
MAJ John R. Archer (LT Assignments) 325-7841
Mr. James Harrison (New Accessions) 325-7841

PERSONNEL ACTIONS AND PROFESSIONAL DEVELOPMENT

MAJ Tommy A. Baucum (Losses and
Gains: Resign, Retirements, REFRAD,
Eff Reports, RA Pgm, Branch Trf,
Extensions, Recall and Direct Appts.) 325-7845
MAJ William G. Yarborough (Profes-
sional Development: Military and
Graduate Schooling, OPMS, Promo-
tions) 325-7837
CPT Lemos L. Fulmer
(Jr. Educ: OPMS, AOAC) 325-7837
Mrs. Agnes Burns
(Civ Educ: DCP and ADPRID) 325-7837
Mrs. Louise Brown
(Initial Flight Training) 325-7839

PERSONNEL SUPPORT SECTION

Mr. Fred Benegalia
(Ch, Pers Spt Sec) 325-7843

ASSIGNMENTS IN COLONELS DIVISION

LTC John M. Petracca 325-7874

For AUTOVON calls, dial 221 and the last four digits of one of the above listed numbers. For commercial calls, our area code is 703. Our 24 hour code-a-phone service is available on 325-7843. Our mailing address is Department of the Army, USAMILPERCEN, ATTN: DAPC-OPD-AR, 200 Stovall Street, Alexandria, VA 22332

HOW WOULD YOU DO IT?



US ARMY ARMOR SCHOOL PRESENTATION

SITUATION

You have just assumed command of Company A, 2d Battalion, 11th Armor, which will participate in an extensive maneuver starting in 30 days.

PROBLEM

As a new company commander, you will not have time for detailed inspections of all of your equipment and records prior to the maneuver. You do spot-check several vehicles, and while they are satisfactory, you are concerned about some shortages in your PLL and whether you will be able to remain operational through the maneuver period. What you need is a method to inspect the Army Maintenance Systems and Repair Parts Supply that does not require a lot of time.

HOW WOULD YOU DO IT?

When inspecting TAMMS and repair parts supply procedures, you want to check for the following:

1. Bottlenecks in processing paperwork which delay repair or service work.
2. Accuracy of forms and records.
3. Currency of entries required on forms and records.
4. Are repair parts requests valid?

Cross-checking all entries in block 12, DA Form 2406, against other records provides a simple, accurate, and quick method of verifying the current Materiel Readiness Report. The figures on the fol-

lowing pages show a sample Materiel Readiness Report. First check the numerical dates in columns d, e, f, and g. Any difference in the dates indicates a possible problem area which must be investigated to determine the exact cause.

Example one: The first entry shows that this tank became inoperative on 4227. It was admitted to the organizational shop on the same day, but a Work Request was not submitted until 4 days later (4231). This indicates that a problem exists with evacuating equipment to direct support. The problem may be with organizational personnel not acting quickly to evacuate equipment, or a lack of transportation. The problem may be at the DS shop. Both areas should be investigated to determine who is at fault.

Example two: Here is an apparent delay in requesting repair parts. This can be established by comparing the dates in column e with the dates of supply request in column g. The request for a fuel line was delayed for 3 days and the request for a radiator, 2 days. Again, these problems must be investigated to determine who is at fault—the maintenance or supply section.

Now you can begin your inspection of the forms and records. Read each of the notes that are keyed to specific data in block 12. This method of inspecting will cover all areas in organizational maintenance records—logbooks, service records, and repair parts records. You will also be verifying the Materiel Readiness Report.

AUTHOR: CPT JERRY O. LUCAS

ILLUSTRATOR: DON ENGLER

DA Form 2407 (Maintenance Request)

1. The "Receipt Copy" (No. 1) should be on file in the shop office.
2. The date in block 24, DA Form 2407, should be the same as date in column f, DA Form 2406.

MAINTENANCE REQUEST		* See reverse of this copy for codes and additional data.		PAGE NO.	NO. OF PAGES	REPORTS CONTROL SYMBOL	
For use of this form, see TM 58-750; the proponent agency is Office of the Deputy Chief of Staff for Logistics.						CSG-1D-1047 (R1)	
SECTION I: A61702 <input checked="" type="checkbox"/> WORK REQUEST <input type="checkbox"/> MWO <input type="checkbox"/> EIR <input checked="" type="checkbox"/> ORGANIZATION ISSUE PRIORITY DESIGNATOR CODE							
CONTROL NUMBER F18729	1A. ORGANIZATION CO A, 2D BN, 11TH ARMOR	2A. LOCATION FT. KNOX, KY 40121	3A. UNIT IDEN CODE WAZCTA				
1. SERIAL NUMBER 4092	2. HOUR NOMENCLATURE TANK	3. LINE NUMBER M60A1	4. FEDERAL STOCK NUMBER 2350-00-756-8497				
7. MAINTENANCE ACTIVITY CODE F	8. UTILIZATION CODE DN	9. SELECTED ITEM <input checked="" type="checkbox"/> NO <input type="checkbox"/> R	10. HOURS 205 11. MILES 2163 12. STARTS 94				
14. FAILURE DETECTED DURING (Select one - see Y or Z) <input type="checkbox"/> SCHEDULED <input type="checkbox"/> TEST <input type="checkbox"/> STORAGE <input type="checkbox"/> FLIGHT <input checked="" type="checkbox"/> OVERHEATING <input type="checkbox"/> OUT OF ADJUSTMENT <input type="checkbox"/> HANDLING <input checked="" type="checkbox"/> OPERATION <input type="checkbox"/> INSPECTION <input type="checkbox"/> OTHER <input type="checkbox"/> NOISY <input type="checkbox"/> LOW PERFORMANCE <input type="checkbox"/> OTHER							
15. FIRST INDICATION OF TROUBLE (Select one - see Y or Z) <input type="checkbox"/> SCHEDULED <input type="checkbox"/> TEST <input type="checkbox"/> STORAGE <input type="checkbox"/> FLIGHT <input checked="" type="checkbox"/> OVERHEATING <input type="checkbox"/> OUT OF ADJUSTMENT <input type="checkbox"/> HANDLING <input checked="" type="checkbox"/> OPERATION <input type="checkbox"/> INSPECTION <input type="checkbox"/> OTHER <input type="checkbox"/> NOISY <input type="checkbox"/> LOW PERFORMANCE <input type="checkbox"/> OTHER							
16. DESCRIBE DEFICIENCIES OR SYMPTOMS ON THE BASIS OF COMPLETE CHECKOUT AND DIAGNOSTIC PROCEDURE IN EQUIPMENT TM (Do not prescribe repairs)							
ENGINE WILL NOT CRANK							
17. SIGNATURE OF THE PERSON REPORTING THE DEFICIENCY James R. Jones, CPT							
18. CHECK "X" IN THE FOLLOWING BOXES <input type="checkbox"/> YES <input type="checkbox"/> NO							
19. SUBMITTED BY M. Thompson							
20. RECEIVED BY S. Jones							
21. JULIAN DATE 4230							
22. JULIAN DATE 4231							
SECTION II - EQUIPMENT IMPROVEMENT RECOMMENDATION							
23. NORMAL REPAIR (Select one - see Y or Z) <input type="checkbox"/> YES <input type="checkbox"/> URGENT <input type="checkbox"/> IMPROVE DESIGN <input type="checkbox"/> REVISE PROCEDURE <input type="checkbox"/> NO <input type="checkbox"/> ROUTINE <input type="checkbox"/> MODIFY <input type="checkbox"/> OTHER (Specify)							
24. LOCATION FT. KNOX, KY 40121							
25. UNIT IDEN CODE WAZCTA							
26. FEDERAL STOCK NUMBER 2350-00-756-8497							
27. OPINION OR REMARKS. DESCRIBE CONDITIONS UNDER WHICH FAILURE OCCURRED. ATTACH PHOTOS OR SKETCHES, IF AVAILABLE.							
28. DATE 4238							
29. VERIFIED BY (Signature) James R. Jones, CPT							
DA FORM 2407 1 JAN 66							

NON-AVAILABLE STATUS - ITEMIZED									
NOMENCLATURE	REGISTRATION OR SERIAL NO.	REASON NON-AVAILABLE A. MODIFICATION B. PARTS C. MALFUNCTION D. SUPPORT MAINT	DATE ADMITTED TO SHOP NON-AVAIL-ABLE	DATE ADMITTED TO SHOP ORGANIZATION	SUP-PORT MAINT	SUPPORT SHOP JOB OR RUN NO	REMARKS OR PART NO.		
TANK, Cbt. FT.	4092	D	4227	4227	4231	A61702	ENGINE		
1A 105-mm GUN, M60A1	1352	B	4230	4230	4233	2910-00-826-5282	FUEL LINE		
1A 105-mm GUN, M60A1	239500	B	4231	4231	4233	2910-00-713-7313	RADIATOR		
6 TRUCK, CARGO, M35A2									

DD Form 314 (Preventive Maintenance Schedule and Record)

This form should reflect NORM time from 4227 to the date of inspection. "O" symbol for organization time and "X" symbol for D5 maintenance time. A NORM or NORS entry is required to be posted each day the vehicle is inoperative.

DD FORM 314		PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE																																																																																																																																																																																																																																																																																																																																																																																																																																														
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DA FORM 2406	
1. REMARKS	
DATE 4238	
VERIFIED BY (Signature) James R. Jones, CPT	
DA FORM 2406 1 JAN 66	

Repair Parts Records

DA Form 2064 (Document Register)

1. Document number in column g and National Stock Number in column h (DA Form 2406) should agree with entry on DA Form 2064.
2. Since the repair part causes a tank to be inoperative, the request should have at least an "05" priority (column a, DA Form 2064).
3. Priority 01-08 should be signed by the unit commander in column d, DA Form 2064.

DOCUMENT REGISTER FOR SUPPLY ACTIONS		ORGANIZATION/ACTIVITY	UNIT IDENTIFICATION	DATE (Mo, Year)	PAGE
PRIORITY AND DATE	DOCUMENT SERIAL NO.	REMARKS	SUPPLY ACTIVITY	QTY	DATE
05	4226	0001	2940-00-019-4775 FILTER	500	2
05	4226	0002	2530-078-2908 TRACK SHOE	500	6
05	4229	0001	3080-00-421-1563 BELT	500	1
05	4233	0001	4254-0124 2540-00-525-7067 LOCK	500	1
05	4233	0002	4234-0167 2910-00-826-5283 FUEL LINE	500	1

DA FORM 2064

DA FORM 3318		RECORD OF DEMANDS - TITLE INSERT	
REPLACES SECTION 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100		2910-00-826-5282	
4201-0002	3	DA Form 3318 (Record of Demand)	
4201-0004	3	1. An entry on the DA Form 3318 is required to record the demand for this repair part.	
4216-0003	2		
4225-0001	1		
4233-0002	1		

DATE 4238
VERIFIED BY (Signature)
James R. Jones CPT
DA FORM 2406

NON-AVAILABLE STATUS		ITEMIZED	
DATE ADMITTED TO SHOP	REMARKS	DATE ADMITTED TO SHOP	REMARKS
4227	4231	4231	4233
4230	4230	4233	2910-00-826-5282
4231	4231	4233	2910-00-713-7313
		4233	RADIATOR

Maintenance Forms and Records

Equipment Logbook

DA Form 2408-1 (Daily Log)

Should reflect inoperative status "X" in column f. Date of entry should be the same as date nonavailable in column d, DA Form 2406.

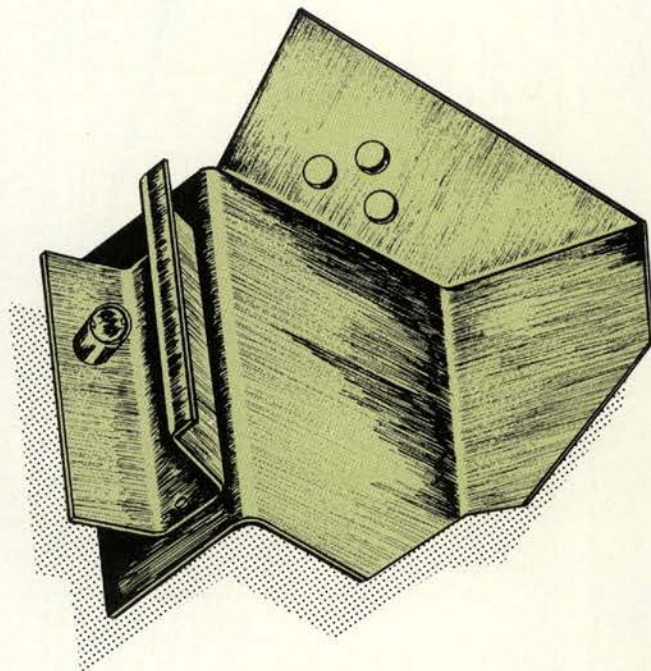
TANK, M60A1		1352	Q2	1476	25 SEP 74
DATE OF ENTRY	READ (NO. HOURS)	REASONS (NO. HOURS)	TOTAL FUEL ADDED (GAL)	TECHNICAL	REMARKS
1 AUG 74	132	1291	12	2	D OILS
12 AUG 74	133	1304	12	2	D OILS
14 AUG 74	134	1316	9		D OILS
15 AUG 74	134	1316			D OILS

DD FORM 314		RECORD OF DEMANDS - TITLE INSERT	
REPLACES SECTION 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100		2910-00-826-5282	
4201-0002	3	DA Form 3318 (Record of Demand)	
4201-0004	3	1. An entry on the DA Form 3318 is required to record the demand for this repair part.	
4216-0003	2		
4225-0001	1		
4233-0002	1		

Status Card File	
1. Check the most recent status card to determine if the status is valid. Check card columns 65-66, DA Form 2765. Status will be coded with two letters. Definition of codes are listed in AR 710-2, appendix F.	

M16 RIFLE ADAPTER FOR LEFT-HANDED SHOOTERS

A cartridge deflector attachment for the M16 Rifle for use by left-handed shooters has been designed and produced by the Fort Knox Training Aids Services Office (TASO). The deflector is designed to deflect an ejected cartridge down, forward, and away from the left-handed shooter. The following schematic drawing shows a design which evolved through testing by the BCT Committee Group at Fort Knox over an 18-month period. This or a similar device can be obtained from your supporting TASO. POINT OF CONTACT: Mr. George Bicket, Autovon 464-2854, Comm (802)-624-2854.



ON THE WAY!

★ In support of the REALTRAIN Program for Armor and Infantry units, the Fort Knox Training Aids Services Office (TASO) is presently fabricating the following equipment items for the US Army Armor School:

- Vehicle Identification Numbers
- 10X Telescope Mounts for Tank Main Gun
- 10X Telescope Mounts for TOW and 106 RR
- M20 Practice Antitank Mine Firing Device
- 90mm Recoilless Rifle Range Plates
- M72A2 LAW Range Plates

These items will be packaged, along with other equipment items, and shipped directly to units after they have attended the REALTRAIN training course at Fort Knox. Phase I, which is underway, will equip four CONUS battalions (two tank and two infantry) and four USAREUR battalions (two tank and two infantry). Phase II will begin on or about 1 May 1975, with all Active Army and Reserve tank and infantry battalions receiving REALTRAIN packages as they are assembled at Fort Knox. Phase II is expected to continue through

June 1976. POINT OF CONTACT: CPT Donald Brunner, AUTOVON 464-4325/2453, Comm (802)-624-4325/2453.

★ TC 71-5, REALTRAIN.

This TC outlines a sophisticated system for more realistic training for small units. REALTRAIN will be printed and in pinpoint distribution by January 1975.

★ TC 17-15-10, KNOW YOUR GOERS.

To be printed and in pinpoint distribution by January-February 1975, this TC provides training managers with equipment tips and a training program for the new GOER vehicles.

★ TC 17-12-3 (Test Edition), BATTLEFIELD GUNNERY TECHNIQUES FOR TANKS.

This TC is being revised and should be in pinpoint distribution during 3d Quarter FY 75. Meanwhile, limited numbers of the test edition are available from: AWTSD, USAARMS, Fort Knox, Kentucky 40121.

★ M48A1 TV Tapes and Audio-Only Lessons.

A series of TV tapes and audio-only lessons are under development for the M48A1 tank. These tapes are programmed for automatic distribution to M48A1 units in March 1975.

M60A2 TELEVISION TAPES

The following series of television tapes for NCOs and Officers on Operational Checks and Maintenance Inspections for M60A2 tanks were released in November 1974. POINT OF CONTACT: ETV Branch, TASO; AUTOVON 464-6745/3725 or Comm (802)-624-6745/3725.

NUMBER	TITLE	RUNNING TIME	NUMBER	TITLE	RUNNING TIME
FK-AS-26A-74	M60A2 CBSS Pt I, Purpose, Location and Nomenclature	08:45	FK-AS-33B-74	M60A2 Conduct of Fire Trainer Installation Target M42	12:04
FK-AS-26B-74	M60A2 CBSS Operator/Crew Daily Checks and Service	06:15	FK-AS-56-74	M60A2 Fire Control System Daily Maintenance Check	04:04
FK-AS-26C-74	M60A2 CBSS Organization Maintenance and PM Service Checks	17:20	FK-AS-57-74	M60A2 Conduct of Firing Pulse Test	04:52
FK-AS-26D-74	M60A2 CBSS Detailed Function	17:46	FK-AS-58-74	M60A2 Laser Range Finder Operation	08:17
FK-AS-27-74	M60A2 Transmitter Alignment Test	11:46	FK-AS-60-74	M60A2 Gun/Launcher Electrical and Manual OPS, Loading & Clearing	03:31
FK-AS-28-74	M60A2 Turret Electrical System Test Set	06:40	FK-AS-63-74	M60A2 152mm Gun/Launcher Operation	04:28
FK-AS-29-74	M60A2 M19 Computer, Preliminary Operation Procedure	03:43	FK-AS-64-74	M60A2 Main Gun Firing Gunner's Position	03:54
FK-AS-30-74	M60A2 Servo Valve Null Test Set	13:45	FK-AS-65-74	M60A2 Conduct of Fire Trainer, Pre-Operation Check	14:26
FK-AS-31-74	M60A2 Fire Control System Test Set	12:55	FK-AS-67-74	M60A2 Missile Guidance System, Checkout Procedures	09:00
FK-AS-32-74	M60A2 Stabilization System Test Set and Sensor Simulator	14:20			
FK-AS-33A-74	M60A2 Conduct of Fire Trainer, Launcher M43	18:10			

TRAINING SUPPORT UPDATE

NEW AND REVISED SUBCOURSES

The subcourses listed below have been recently developed or revised by USAARMS. Individuals may obtain them by enrolling in a Correspondence Course Program. To enroll, mail a completed DA Form 145 to the Assistant Commandant, USAARMS, ATTN: ATSB-TS-CC, Fort Knox, Kentucky 40121.

ARM 113 Communications in the Company Team — REV

Principles of communication; communication responsibilities; armor radios, control, and interphone equipment; communication procedures; communication-electronics SOP and orders; radio-telephone procedures; communication security; radio jamming and antijamming measures; tactical wire equipment; antennas and field expedients for antennas; and communication systems, tank and rifle company/team and armored/air cavalry troop.

Eight lessons and examination — 29 credit hours.

ARM 132 Race Relations — NEW

Racial discord and unit effectiveness; minority group contributions to the national and unit effort; indications of racial unrest; and solving racial problems and differences.

One lesson — 2 credit hours.

ARM 180 Air Defense — NEW

Methods of identifying friendly and enemy aircraft; active and passive air defense measures; and organization and employment of the Redeye Section.

One lesson — 2 credit hours.

ISS 275 Individual and Group Communication — NEW

Techniques and methods to insure effective senior/subordinate communications in an individual and group situation; concepts involved in establishing individual and group communications; techniques that apply to the conduct of individual and group communication; and techniques of interview.

Three lessons and examination — 6 credit hours.

ARM 324 Communication III — REV

Single sideband radio equipment; tactical wire equipment; installation and operation of radio-wire integration systems; and armor command radios.

Four lessons and examination — 9 credit hours.

ARM 561 Combat Intelligence for Armor — REV

Organization and function of the intelligence staff section; steps in planning intelligence collection efforts; development of the collection work sheet; direction of the collection effort; processing of combat information; and preparation of an intelligence summary and an intelligence estimate.

Two lessons and examination — 8 credit hours.

ARM 563 Operation Orders and Plans — REV

Purpose and types of combat orders; use of military symbols and control measures; preparation of warning and fragmentary orders; format and content of operation orders; and development of an overlay-type order.

Four lessons and examination — 10 credit hours.

ARM 571 Combat Service Support Estimates and Orders — NEW

Use, format, and content of combat service support estimates; dissemination of combat service support instructions; and preparation of service support annex and paragraph 4 of an operation order.

One lesson — 3 credit hours.

Now Available at TASO

The following Graphic Training Aids have recently been received by TASOs and are available for issue:

GTA 5-4-26	Operator Checks and Services, Mobile Assault Bridge (MAB) Maintenance, 1974
GTA 9-1-179	Automotive Principles, March 1974
GTA 17-6-3	Pistol, Automatic, Cal. .45, M1911A1
GTA 17-6-4	Tank Gunnery Communications, July 1973
GTA 17-6-5	Tank Gunnery, Detection and Correction of Gun Malfunctions, July 1973
GTA 17-6-8	Tank Gunnery, Turret Inspection and PM Service, July 1973



A DIFFERENT KIND OF "FIELD TRAINING" FOR 1ST ARMORED DIVISION SOLDIERS

The next time you quaff a mug of your favorite brew, you may have soldiers from the 1st Armored Division to thank for the distinctive "kiss of the hops" taste.

Soldiers from the "Old Ironsides" Division joined German farmers in harvesting their hops this fall. This vital action took place near the German community of Beerbach. Where else?

The effort was part of a project called "the GI on the farm" program. Soldiers spend two weeks living and working with their German farmer hosts. This year "Old Ironsides" soldiers helped nurse the hops from spring care through harvest.

Specialist Four Bruce A. Fuller of San Diego, California, and Private First Class William N. Greene of La Canada, California, are two soldiers who have been "GIs on the farm." Under the supervision of their host, Karl Lang, a Beerbach farmer, they found that harvesting hops from dawn to dusk was no piece of cake. They also had to work with livestock and in wheat and potato fields.

"The first few days were the roughest," Specialist Fuller explained. "My bones ached, I was scratched from the hop vines, and I was dead tired by the time 7 p.m. rolled around."

But it was worth the effort. Private Greene summed it up saying the two weeks on the Lang farm gave him a chance to do something constructive and improve his German at the same time.

For some soldiers, the best is yet to come. A plan is in the works for soldiers to help put the finishing touches on the year's efforts. Hopefully, some soldiers will get to work in the German breweries around Christmas time and really see their efforts ferment.

DRAGON TESTED AT MASSTER

Dragon, a new antitank guided missile system is currently undergoing rigorous field testing at MASSTER (Modern Army Selected Systems Test, Evaluation and Review).

The *Dragon* weighs approximately 30 pounds and is light enough to destroy armored vehicles and battlefield fortifications with a high degree of accuracy.

"The reason for the high rate of accuracy is because the *Dragon* missile can be guided toward the target once the missile has been fired," explained Major Robert C. Barron, a test officer at MASSTER. "As the missile is in flight, it trails out a thin wire that is used to transmit electronic signals from the gunner that corrects the missile's direction."

Once the missile is fired, all the gunner is required to do is keep the cross-hairs of his sight on the tank or other target until the missile impact.

The *Dragon* has been tested extensively at other Army agencies before, but the objective of the current MASSTER study is to monitor the functioning of the *Dragon* system in an operational environment instead of on a firing range.

As part of the test, inert missiles will be fired at manned, moving tanks, simulating combat conditions.

If the *Dragon* passes this series of field tests and proves its value, it may be issued to Army combat units in the near future, according to test officials.



SCHOOL FOR SOLDIERS: West Point and the Profession of Arms by Joseph Ellis and Robert Moore. Oxford University Press. 291 pages. 1974. \$9.95.

The most provocative book about the United States Military Academy has to be *School for Soldiers: West Point and the Profession of Arms*. This work provides an extremely interesting view of the Academy today. The authors are both former academic instructors at West Point. Joseph Ellis taught for the Social Sciences and, later, History Department from 1969 to 1972, while Robert Moore instructed cadets as a member of the English Department from 1968 to 1970. With these facts in mind, the authors had access to a wealth of factual information and first-hand interviews with cadets and Academy officers.

The book begins with an historical look at the Academy. An enlightening examination of the Thayer System highlights this initial portion of the work. The authors use the Thayer System to lead into their views of the academic program at West Point. They conclude that the Academy does not afford cadets a quality university education, but rather a socialization process in which these civilians are changed into military men who happen to receive a college degree at the end of their four-year stay. Ellis and Moore believe that the academic environment is a stifled one at best.

School for Soldiers provides an outstanding insight into the trials and tribulations of USMA academic instructors. This portion of the work provides a potential instructor with a seemingly factual view of how the academic system may affect him and his ideals.

Other areas of special interest in the book are: the USMA football situation and its effects, the abolition of mandatory chapel, the attitudes of the annual Board of Visitors to West Point, and the authors' evaluation of the actual academic quality of West Point and how it compares to major civilian universities.

The most intriguing area of the book is the authors' examination of the West

Point Honor Code and Honor System. They examine honor and how it related to three men: General George S. Patton Jr., Brigadier General Samuel Koster, and Cadet (now Lieutenant) James Pelosi. An interesting account of how the latter individual's case ultimately led to the abolition of the "silencing" process is provided. However, as a 1969 USMA graduate, I strongly disagree with the authors' belief that an ominous attitude toward honor is becoming increasingly more common at the Academy today. Ellis and Moore state that most cadets believe in the Honor Code, but many are disenchanted with the Honor System. These cadets apparently feel that the Honor System is actually an extension of the Tactical Department's grip on the livelihood of the cadets. Thus, the Honor System becomes yet another system for these cadets to "beat."

I highly recommend *School for Soldiers* to all USMA graduates, all career officers and, especially, to all of those officers who intend to be academic instructors or tactical officers at West Point.

Captain Douglas H. Madigan
Armor Officer Advanced Course—1975

THE WOUND WITHIN: America in the Vietnam Years, 1945-1974

by Alexander Kendrick. Little Brown. 432 pages. 1974. \$12.95.

Alexander Kendrick, long-time correspondent and commentator for CBS News, has written what he describes as an account of the "Vietnamization" of America from 1945 to 1974. In his preface, Kendrick says that in his book, he "strives to follow the rule used in the author's 40 years of news reporting and interpretation, that while objectivity in its dictionary definition is not possible—'uninfluenced by emotion, surmise or personal prejudice'—fairness is."

It is an interesting insight into his journalistic standards to see what Kendrick believes is fair. For example: "... when Mao Tse-tung's Communist forces won victory on the Chi-

nese mainland . . . the reaction of Republican Senator Wherry of Nebraska to the Communist victory was one of Christian charity, and therefore hardly typical. 'With God's help,' he declared, 'we will lift Shanghai up and up, ever up, until it is just like Kansas City.' Nearly everyone else on Capitol Hill was critical of the 'loss of China.'"

Is it fair to that arch-conservative, Senator Kenneth Wherry, the man who demanded Dean Acheson's resignation as secretary of state on the grounds Acheson was "soft on Communism," as applauding the Communist victory in China? Even with the award-winning precedent set by CBS News with the "Selling of the Pentagon," (where they edited a video-tape recording to rearrange a speaker's words to fit their script) is it fair to take Senator Wherry's comments made in 1940 about the Chinese Nationalists and fit them into his mouth nine years later to describe the Chinese Communists?

Is it fair for Kendrick to classify the United States Air Force with the Luftwaffe, to categorize American bishops with the German bishops of World War II, to make such inflammatory and overblown statements as:

"There is one easy test of the 'just' nature of the Vietnam war: suppose that its motives and methods had been applied to Europe rather than to the small southeastern corner of Asia. Imagine then what would have been done to the 'Mother Country' . . .

"If it is argued, as it frequently is, that Asia is not as 'civilized' as Europe, that life there is somehow less worthy or desirable, it can be pointed out that even the Japanese conquerors of Asia, not to mention the Mongols, did not go so far in the systematic wholesale carnage as the American liberators of Indochina."

Why such gross distortion from an experienced newsman who surely knows better? Why, if the Vietnam War was so clearly illegal and immoral, is it necessary to exaggerate the facts? Having been in Germany and Japan after World War II, having stood at what was the heart of the residential area in Berlin with nothing but rubble as far as the eye could see, having witnessed similar destruction in Japan, I read Kendrick's words while traveling to Hanoi and reflected on them as I toured what to my eyes was an

undamaged city and while I dined in a 50-year-old hotel in the center of town.

Applying Kendrick's test for a just war, the war in Vietnam appeared just indeed when compared with Dresden, Hiroshima, Nagasaki or the fire bombings of Tokyo. To compare American activities in Vietnam with the Mongols—who killed every living thing in Central Asia (about 14 million people)—is to admit that the "facts" must first be rearranged so that they can support his case.

The villain of Kendrick's book is the United States, and the architect of that villainy is Richard M. Nixon. He stalks the pages like a sinister force, smearing his enemies, bugging his rivals, in sharp contrast to that paragon of virtue, Ho Chi Minh, who merely had his competitors assassinated. Kendrick's book is the flesh behind Hanoi's *Thong Nhat* newspaper editorial that "the dirty face of the imperialist United States has become even filthier . . . Nixon's activities have laid bare all the contemptible rottenness of US society."

Kendrick's book is flawed. It is flawed by what he himself decries in his preface:

"A climate of fear, suspicion, uncertainty, political demagoguery and public spectacle bred the virus that Vietnamized America. It grew through indifference, ignorance, moral righteousness, unwillingness to confess error and other human faults, notably arrogance."

What Kendrick fails to say, however, is that with his book, he is a virtual "Typhoid Mary" of that very virus. There is another flaw. In a masterful analysis of critics of the Vietnam War, Professor Earl C. Ravenal of Johns Hopkins University (in the June 1974 *Asian Survey*) comments on the moral approach: "I find . . . immorality . . . to be a blind alley. The search for villains will certainly uncover some real ones; but this is beside the point . . . the moral argument does not ask enough of the analysis, and therefore promises too much of the proposed remedy."

But nonetheless *The Wound Within* is an important book. It is an important book not because it is fair, not because it is factual, not because it is unbiased, but precisely because it is none of these things. It is an important book because it illustrates the dark mood of one of our nation's media spokesmen—a calumniator rather than a commentator—on the eve of our first presidential resigna-

tion. Unfortunately it probably will be widely quoted as evidence that the President fell, not because of his misdeeds, but because of a vindictive media campaign. Kendrick has done his colleagues a grave disservice.

Lieutenant Colonel
Harry G. Summers Jr.

SOVIET CONQUEST FROM SPACE

by Peter N. James. Arlington House. 256 pages. 1974. \$8.95.

Peter James used to work for Pratt & Whitney Aircraft and, while there, prepared assessments on Soviet capabilities for the US Air Force. He is obviously an expert in space technology, and his intelligence evaluations have received widespread attention within the US Government. In the course of his work, he became concerned over the public's ignorance of Soviet espionage programs and growing space activities, and he elected to write this book despite warnings from his superiors. He wrote it and was subsequently fired for his pains.

The book is something of a paradox. Parts are carefully explained, detailed analyses, and parts—like the Soviet political organization—read like a college freshman's theme. The book professes to be an intelligence assessment for the reader who has no technical background, and it is replete with data. But much of the data is already familiar since it is readily available in the public domain, and the remainder is unsubstantiated and must be accepted on the author's say-so. The majority of his data is somewhat old, dating back to the 1950-1960 period and forecasting for the 1970s, now almost half gone. He makes quite a bit over the Soyuz spacecraft and its capabilities, alleging major advances over US capabilities. This seems to be overemphasized, however, in light of the August 1974 failure of Soyuz 15. This lends credence to doubts about whether he has overemphasized throughout his text, a not uncommon trait of intelligence personnel who are often concerned with worst cases.

Alarming rhetorical statements like ". . . if we do not strengthen our offensive and defensive strategic forces, we face annihilation in the years ahead; if we do not reduce the cost of deploying new weapons systems,

we face bankruptcy" serve only to reinforce doubts about the objectivity of the author. The book's illustrations, drawn by the author's brother, are rudimentary and comic-strip style, their lack of style further detracting from the text. On the other hand, the treatment of the Soviet space activities is very readable and interesting, clearly demonstrating that the author is at home here.

The book's two greatest weaknesses appear at the end. In his last chapter, titled "What Can You Do?" aimed at the voting public, James displays a remarkable ignorance of political realities. He proposes, for example, that Congress guarantee NASA now a specific budget for the next ten years that could not be changed by a subsequent Congress. He proposes that the best engineers in every major corporation be formed into a "national defense team" and be paid by the government. If a corporation later lost money and laid off personnel, the defense team would be "untouchable" because of breaking up of experienced teams is an "unethical practice." He attacks broadside the nation's social and defense programs, asserting that it is their costs that reduced NASA's support. And he attacks the commentators, news reporters, government officials and just about everyone else he can think of who might have had a hand in cutting space funds. At the end he sounds like an embittered engineer who was laid off and decided to write a Grand Exposé.

From a soldier's viewpoint, the most bothersome part lies in his appendices. Throughout the book, James constantly reiterates the weaknesses of our security systems and the efficiency of the Soviet espionage programs. He warns about the dangers of careless talk and slipshod procedures. Then, in his appendices, he produces photocopies of two SECRET-NOFORN documents! Regardless of the fact that he was the author of these reports and that they were classified supposedly to protect his identity, this blatant willingness to violate security to serve his own ends reflects the same egocentric attitude shown by Daniel Ellsberg of the Pentagon Papers notoriety. And it casts even greater doubt on the author's objectivity and true aims.

In sum, a book of doubtful value, written in an alarmist vein and accomplishing little toward really helping our space program.

Colonel John R. Byers
Chief, OPD-AR

THE GENERALS: Making it Military Style

by Maureen Mylander. The Dial Press. 397 pages. 1974. \$10.00.

The Generals makes some good points and provides some good examples of improvements that must be made in the officer corps. For example, the description of Pentagon duty is excellent and the evils of short tenure assignments for general officers are well stated. Unfortunately, other good points become lost in a maze of inaccuracies, misused and misstated facts.

The introduction states the book is not an expose; however, after reading the book, one returns to the dictionary to insure the meaning of expose is fully understood. The book is not only critical throughout, but it belittles the officer corps in almost every respect. To agree with the book, the reader must first accept the premise that knowledge concerning the profession of arms is not education. In degrading the faculty at the war colleges, the book makes the point that one man, lowest in his academy class, taught at the War College. The military reader will quickly realize that only senior officers teach at the War College; but will a civilian realize that 18-25 years experience was gained between the two events? In the discussion of how military officers are not allowed to dissent, the book uses Lieutenant Colonel Anthony Herbert as an example of what happens to a highly decorated officer who criticizes fellow and superior officers. To be objective, the book would have mentioned the Mike Wallace television show which revealed enough untruths in the Herbert story to completely discredit him.

Many statements presented as facts are incorrect. For example, while Lieutenant General Seneff, as a colonel, made major contributions to air assault tests, he did not command the 11th Air Assault Division. The book infers an incorrect amount of tax-free retirement pay that Major General Lavelle is now drawing. In comparing the decorated Army general with the president of General Motors, the book implies that the leadership problems are the same in the two organizations.

Perhaps the greatest injustice done the general officer is the statement that he craves obedience and order

as a personal predilection without any mention of the military necessity of such discipline if the military is to be successful in combat. That discussion of discipline continues by criticizing the wearing of insignia and West Point ring as each is an object of reverence. The book offers very little in the way of knowledge, and is certainly not worth the price.

Lieutenant Colonel Carl M. Putnam
HQ FORSCOM

REVOLUTIONARY WARFARE IN THE MIDDLE EAST

by Bard E. O'Neill. Paladin Press. 140 pages. 1974. \$5.95.

This 140-page book describes in brief detail the activities of the Palestinian fedayeen in 1967-1971 and the successful countering programs of Israel.

The fedayeen saw their hopes for the destruction of Israel fade after the 1967 war, as one Arab country after another began to withdraw, in fact if not in name, from any protracted conflict. Some dramatic action was required to keep alive the war that threatened to disappear and to focus the world's attention on the fedayeen's goals. Taking substantial inspiration from other recent guerrilla campaigns, the fedayeen argued that a "protracted popular war of national liberation" employing guerrilla armies had failed. They remembered that terror from the Stern Gang and others had helped create Israel; maybe terror could help bring it down. But they didn't reckon with Israel's strengths and ability to capitalize on historical lessons.

Dr. O'Neill has filled a void in the extensive bibliography on counterinsurgency warfare, for this book is really dedicated to Israel's success rather than a general dissertation on revolutionary warfare. Readers who are familiar with the techniques used in Malaya, Algeria and Vietnam will find this an interesting counterpoint. The Israelis learned from others' mistakes and they learned well, following the principles and examples of Magsaysay possibly more than any other. And they improved on those. They were sensitive to the residual effects of such traumatic programs as relocation and search-and-destroy missions, but at the same time they were

willing to move swiftly and ruthlessly against a discovered enemy. Though they stumbled a few times—as in the retaliatory attack on the Beirut Airport—their programs were so successful that by 1971 the fedayeen's support had virtually ceased, and the guerrillas had fallen into weakened, quarreling factions.

While the Palestinians' increased reliance on terror has continued to gain them the world's headlines, it has also dramatically demonstrated their decreased effectiveness in sustaining a protracted war and earned them international disrepute.

Dr. O'Neill observes that "history books are replete with accounts of counterinsurgency efforts which have failed because the government made little effort to understand the challenge they faced . . ." This is an account of one government that made that effort, and won. It's well worth reading and is a useful addition to any military library.

Colonel John R. Byers
Chief, OPD-AR

FRONTIER VIOLENCE: Another Look

by W. Eugene Hollon. Oxford University. 279 pages. 1974. \$7.95.

The violence of the '60s—with the political assassinations and the race and antiwar demonstrations—upset most thinking Americans. W. Eugene Hollon, in *Frontier Violence*, endeavors to find the basis for this recent violence in our history.

He traces violence on the frontier from our Puritan beginnings, with their intolerance toward the Indians and religious dissenters, to acts of violence preceding the American Revolution, thence to Jacksonian Democracy and to the series of events that plagued the nation prior to the Civil War. He then concentrates on the Western frontier where racial bigotry and gun culture achieved a high level. The book focuses on the West during the 19th Century.

The frontier enriched our vocabulary with such words as lynching, vigilante, dry gulch, posse, rustlers and gunslingers. The assimilation of these new words was concurrent with a specific period of violence. Unfortunately, the dime novels, Hollywood and television have given us a ro-

mantic view of our past. Mr. Hollen debunks this misplaced idealism and tells it as it must have been. Our ancestors who fled oppression in other countries were quick to impose their wills on the local minority, were they Indians, Mexicans, Blacks or Chinese. Their intolerance was not only directed toward religious dissenters, but also toward any culture alien to their own, hence the oppression of minorities.

The author ends on a positive note, giving us the "other side of the coin" by demonstrating that much more of what is good in the American character than what is bad came from our frontier heritage. As he says in his preface, "Perhaps the real violence of the frontier was related more to anxiety, tension, frustration and prejudice than to any action by outlaws, Indian fighters and assorted vigilante groups."

Again the real truth lies somewhere between the romantic portrayal by Hollywood and the shocking examples cited by the author. Probably the most prominent feeling on the frontier was loneliness followed closely by boredom and lack of excitement.

The author failed, however, to lead us to any conclusions relative to our present disorder. Admittedly, it is difficult to cover over 200 years of history in 200 pages, but he had led me to hope for more than he gave. Perhaps he will continue in another book.

Colonel C. A. Mitchell
US Army Armor School

WAR TO THE DEATH, the Siege of Saragossa

by Raymond Rudorff. Macmillan. 272 pages. 1974. \$8.95.

War to the Death, the Siege of Saragossa, 1808-1809, describes total war in its full panoply of destruction and hate. It deals with a siege not rivaled for its ferocity until the siege of Leningrad in 1941. A "people in arms" fighting with all means available to prevent the capture of their city provided the first psychological and physical setback for the hitherto undefeated Imperial French forces in Europe, and was a tocsin for the uprising of Spain and the commencement of a bitter six-year struggle which culminated in the defeat of France. The constant drain of re-

sources caused by the French attempts to subdue Spain from 1808 to 1814 cannot be underestimated in their effect upon the eventual defeat of Napoleon. The siege of Saragossa was of critical importance to the Spanish war effort.

Acts of heroism and chivalry by combatants of both forces are frequent, but are overshadowed by the horrors of the siege and the bitter house-to-house fighting. Palafox, the Spanish leader, demonstrated the ability to whip up the fury and morale of a populace by means of propaganda, threats and promises, and was an important factor in the extended resistance of the Spanish population of Saragossa. However, the true heroes of the tale were the common people defending their homes with the same intense fury as the world witnessed in Russia in 1941.

This book provides insight into what can be accomplished with limited means by a population, if the will to resist exists. It also describes the technical military problems posed by house-to-house fighting over an extended area with limited resources. The book is well worth the price and time for any student of military history and military art.

Captain James S. Wheeler

BREAK OUT. Famous Military Escapes of the World Wars

by Graeme Cook. Taplinger. 189 pages. 1974. \$7.50.

Break Out is a series of five documented accounts of man's ability to overcome great odds in the face of overwhelming hardships to escape his captors and to return to his own forces. Each account relates in some way to each other, be it the hardship endured, the odds against making the escape, or the determination to survive. While most escape novels tend to glamorize the adventure aspect, *Break Out* shows the reader that escape from the enemy's hands is not what it's most often portrayed to be.

Break Out will not disclose any new ideas about escape or evasion techniques, nor will it offer a "lesson learned" overview for further emulation. *Break Out* is not written in novel form, where you have a multitude of characters to thicken the plot, but rather as a factual narration of the

events leading to capture, the imprisonment, and the final "break out" to freedom.

The five men whose lives were disrupted have one basic similarity: the determination to escape. Three of the men were British subjects, another was Norwegian, and the last was German. Their escape routes varied from the frozen arctic wastes through the sultry heat of Southeast Asia. For the most part, all these men had to travel through a hostile land where the citizens would not aid them in their quest. They were invariably exhausted, hungry, tense and frightened men, who knew that every step they took might lead them back into the miserable hole they had escaped from, or bring them a bullet.

During the two world wars, many men attempted to escape. The episodes described represent only a few of them, some lucky, some not. Jan Baalsrud who escaped across the arctic wastes; Warrant Officer Grimson who tried more than once, and then paid the ultimate price for others; Charles McCormac who fled the Japanese; Oberlutnant Franz von Werra who almost wrecked the British system of interrogation; and finally Lieutenant A. J. Evans of the First World War—all men who would not be caged.

The only theme portrayed throughout *Break Out* is escape. In order to do so, the escaper had to survive. What the reader must recognize is the prisoners' intolerance of confinement and captivity which drove them to attempt their escapes against the uncountable odds and hardships. That clever ruses were used in some cases to effect the escape was not the purpose of relating these episodes, but to point out the absolute essential factors of the will to survive, coupled with unprecedented luck, if their efforts were to gain the ultimate goal of a successful escape.

Despite the rather "matter-of-fact" way the book is presented in writing, with no adventure-story connecting phrases to flesh out the saga, *Break Out* is worth reading. Each of these men could have Hollywood-type films made about his story, as many attempts have been made of our own heroes. *Break Out* is a straightforward version of how a "true soldier" would care to relate his experience. The episodes are short, direct and factual . . . a tribute to the men who lived them.

Major Charles E. Griffiths
AUS-Retired

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STAPLE

Pages from the Past

MACHINE GUNS

The rifle caliber machine gun is a more or less intricate mechanism. It is carried upon wheels or upon a pack animal, and requires an appreciable length of time to come into action.

Firing from a wheel mount or from a tripod it can deliver 600 shots per minute, so that it is equal in fire effect to about 60 men. Its advantages are:

1. By its rapidly concentrated fire effect can be secured and controlled.
2. It is easily concealed especially when mounted on a tripod and used close to the ground.
3. It can be used as a range finder; the strike of the rapidly-delivered fire being visible when the strike of ordinary fire of infantry could not be seen.

Its disadvantages are:

1. The length of time required to come into action.
2. The noise it makes, which reveals its locality.
3. The fact that it can be used at a halt only.
4. Inability to keep up a long sustained fire.

Whether machine guns should be distributed among the smaller units of a command, one to each battalion for instance, or whether they should be concentrated into sections or batteries and used together like guns of a battery of artillery, has not been decided. The prevailing military opinion in Europe favors concentrating them into sections of about six guns each and attaching these to battalions or regiments. Operating more than six guns together is not favored, because grouping the guns draws artillery fire. Our plan is to distribute them among regiments organized so that they may be grouped by order of brigade or higher commanders.

Cavalry Journal
April, 1907

MOUNTED SERVICE BADGE

In order to encourage excellence in individual mounted work and in order to give every soldier ocular evidence that such excellence is considered of high importance, a "Mounted Service Badge" should be adopted. This badge should be awarded to every cavalry soldier (or officer) who shows himself to be exceptionally proficient in horsemanship and horse training, scouting, mounted fencing and riding at heads, or in mounted pistol shooting. The badge itself, should be inscribed simply "Mounted Service," the reason for its reward appearing only on the one or more bars attached to it. These bars should be inscribed "Scout," "Expert Horseman," "Saber Expert" or "Pistol Expert," as the case may be.

Cavalry Journal
November, 1912

MILITARY CYCLISTS

Military bicycling is attracting at the present time a great deal of attention. At a large meeting held on the 15th of last October in New York an important society was formed for the purpose of contributing to the national defense of the United States in case of war by developing the application of the bicycle to military necessities. At this meeting much interest was manifested in the Paris-Bordeaux competition of automobile carriages, as well as in the folding bicycle, invented by Captain Gerard and in the services rendered by soldiers mounted on bicycles at the time of the last grand maneuvers in the Vosges.

Cavalry Journal
March, 1899



Coming in **ARMOR**

"The Night Attack and the Unexpected"

A night attack is the true test of a tank unit's professionalism and combat effectiveness. Some of the reasons for it being such a test are outlined by Captain Robert Doughty of the USMA Department of History.

"Is the Code of Conduct Viable?"

The Code of Conduct has been questioned from its beginning, and we seem no closer to understanding it now than we did when President Eisenhower issued the Executive Order establishing it in 1955. Captain David Matthews discusses the effects of the Code on the prisoners, and of the prisoners on the Code, in Korea, Vietnam, and other such "incidents."

"River Crossing — Key to the Modern Battlefield?"

Soviet and American bridging capabilities are compared by Captains Eugene Betit and Russell Barry. Soviet bridging equipment, as demonstrated in the Mideast wars, proves the importance of continued development of bridging equipment.

"Motorcycle Scouts"

A scout who can slip through enemy lines, ride to within 20 meters of moving vehicles, and travel cross-country in excess of 36 kilometers per hour in daylight has several desirable characteristics. Captain Cecil Green tells how the cycles were employed in the MASSTER test at Fort Hood, and the problems encountered in those tests.

"The Armed Helicopter: What's Next?"

The lessons learned by their fixed-wing brothers in aerial combat since World War I are applied to the mid-intensity environment by Captains Richard Van Pelt and Douglas Madigan who conclude that conducting raids and countering Soviet-style desants and armor are only part of the mission of armed helicopters.



THE
ARMED HELICOPTER-
WHAT'S
NEXT?

march — april 1975

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Cover

An AH-1 Cobra, employing proposed Redeye/Stinger components and missiles, engages an enemy aircraft. Although the attack helicopter's primary role is air-to-ground, history indicates it may soon be forced into air-to-air confrontation. Principles used in such a realm are suggested in "The Armed Helicopter — What's Next?" beginning on page 12. (Illustration by Steven Flanders)

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LETTERS

More on "Tank Gunnery"

Dear Sir:

One of the advantages of being a National Guard officer is the ability to write as a civilian as well as an Army officer. I read "Our Tank Gunnery Needs a Revival" (*ARMOR*, September-October 1974) and thought some comments might be worthwhile. The article impressed me greatly, both as an Army officer and as personnel manager for National Shoes, Inc. What was written about was training, and training is a large part of my civilian job, specifically the training of the 15,000 people I supervise in 450 stores in 30 states.

Civilian training of course differs from military in many ways. In one sense, I train people to achieve an objective that must be estimated re: cost in terms of dollars. In the Army, cost is measured in terms of lives. The two are certainly not comparable. Despite this difference there are similarities, and one of them is the realization that realism in training cannot be overdone, and that by underdoing it performance on the job/in combat must suffer, costing dollars/lives. My two tours in Vietnam as a squad leader and platoon sergeant drove home the point as far as the Army is concerned. The bottom line in business drives the point home at work.

As an Armor officer I am too well aware of how *poorly* trained I am in gunnery. Oh, the Armor School taught me very well how to handle the mechanics of a tank, and how to fire from a nice stable position, but as far as what Lieutenant Colonel Bahnsen spoke of, realistic combat-type training, I have never had it. In Vietnam I was, for all intents, an infantryman anyway, and in Germany, a scout, so I have never even fired the Tank Commander's Course in Europe. Which brings me to my point: There is *no way* we will ever train any enlisted man to be a proficient combat gunner or crewman unless the teachers/officers/senior NCOs are taught first. We have a saying here, which I have heard in the Army also. It states that whatever the supervisor does not supervise does not get done. Since we believe that, we first make absolutely certain that our supervisors, executives, etc. at all levels are thoroughly trained in all new procedures before they are permitted to instruct others. We do this at our own training center. It seems that the article might have specified

the need to do what Colonel Bahnsen suggests first at Fort Knox, for several reasons.

1. The comment about safety fears is most valid, and one of the things that must be overcome is the fear that a new program is dangerous. So Fort Knox is the place to set it up and by "doing it" show the teachers (officers, NCOAC students) that it works.

2. Establishing a new training doctrine involves a lot of de-bugging: All of which should be completed before the program hits the people it is finally to be directed at.

3. There is a tremendous, well-qualified, pool of experts at the Armor School with whom to experiment.

4. A successful program would immediately get the backing of the Armor Center itself, which makes it a lot easier to translate idea into doctrine.

Several times a year I have occasion to go in to see our company president and recommend a new program. Invariably I am asked to project the results and costs, and compare the two. You have the advantage of having easily defined and irrefutable results as a goal, and a cost in lives to be saved as a backup. I wish some of my ideas were as clear-cut and obvious in necessity.

I am presently going to graduate school to earn an MBA. One of the courses I am in stresses the idea of management by objective. Business lags about a century behind the Army in this respect, and in others. But, in one area we are far ahead . . . because we are profit-motivated, we do what works, we discard what is not efficient, and we demand that training achieves objectives. Our bottom line is dollars, our incentive is bonus payments and dividends. The Army has a far more crucial bottom line, and while we can file bankruptcy, the Army cannot dare to fail. I do not believe the Army does an adequate job of training, and that means that the men who will have to fight our next war are being cheated.

What I liked best about the article is the fact that success in combat must be the guiding light for all training. I believe the Army has "over safety'd" itself to the point of foolishness. I cannot understand why the fact that combat training is dangerous should bother anyone . . . after all, we are not readying ourselves for a pillow fight. To use a cliché, a little bit of blood and a whole lot of sweat in training saves

gallons of blood in combat.

I sincerely hope that Colonel Bahnsen's article is just the first of many from senior officers like him. When our next war arrives, as I pessimistically believe it will, I would like to go into it at least as well-trained and with men as well-trained as those I have in my civilian company.

KENNETH A. SIEGEL

First Lieutenant, NYARNG
Bronx, New York 10451

"Value of the Saber"

Dear Sir:

With reference to Mr. Andrew J. Eckles' article, "Value of the Saber in Modern Armored Combat" (*ARMOR*, November-December 1974), I would like to say that it is about time someone has taken hold of a very real problem and offered realistic solutions. Being an *ARMOR* subscriber for 11 years, I cannot recall in that time span anyone addressing this problem in your pages.

Although I have never commanded a tank platoon, I imagine it must be like driving five automobiles at once in freeway traffic at rush hour. I can relate to my experience as a rifle squad and platoon leader, and say that when I allowed myself to become personally engaged in an individual firefight that my control of the personnel under my command suffered. Having had no combat experience, I realize that this problem must be significantly multiplied in combat with the consideration of the factors of danger and heightened emotion.

In my personal view the tank commander and especially the tank platoon leader should be in the same position as the captain of a warship. His sole function is to command. He does not physically operate his many weapons systems, but causes them to function by his actions and orders. The tank commander/platoon leader is not or should not be paid to operate a .50 caliber. He is paid to lead and to exercise the functions of command.

Mr. Eckles presents some well thought-out ideas. Maybe it is time to take a new look at the commander's role in the tank designs of the future.

CHARLES W. TREESE

Captain, MDARNG

Silver Spring, Maryland 20904

Armor Association Saber

Dear Sir:

I would like to thank you and the Armor Association for the presentation saber. I was very happy to receive the saber from Major General Jonathon R. Burton. The award came as a surprise, as my battalion commander kept any knowledge of it from me until the last minute.

The saber is an award I will always treasure in the years to come.

MICHAEL R. THRASHER
Second Lieutenant, Armor

APO, New York 09045

"Armored Assault" Discussed

Dear Sir:

I found Major Ledbetter's article, "Armored Assault Across Europe: Can it be Stopped?" (September-October 1974), interesting and thought provoking. However, his diagnosis, I feel, should be reconsidered before his prescriptions are adopted by NATO. Major Ledbetter advocates the adoption of a mobile defense by the Central Europe Theater Commander. This prescription seems to either avoid or neglect political factors which may dominate in consideration of any course of action. A mobile defense requires the surrender of terrain so as to draw one's adversary into a salient which can be destroyed by counterattack. The critical issue that Major Ledbetter neglects is the political acceptability of allowing a penetration of the Federal Republic of Germany. I tend to agree with Major Ledbetter's belief that NATO may not have sufficient forces to conduct a position defense, for any extended period, but I disagree with his remedy of compensating for this weakness with strategic changes that may be politically unacceptable. It might be more acceptable and possibly more cost effective to acquire the anti-tank capability and doctrine necessary for a positional defense.

Of course, the notion of employing TOW-armed attack helicopters may be fashionable in some circles, but such a notion raises more issues than it settles. For instance: Can the attack helicopter survive over a mid-intensity battlefield where the opponent has approximately 700 antiair weapons per division? Can the attack helicopter operate effectively over a battlefield scored by electronic warfare emissions and rent by artillery

air bursts? These are only a few of the critical issues that need to be addressed before Major Ledbetter's solution can become even remotely practical.

At the strategic level Major Ledbetter argues that NATO needs the capability to fight an extended conventional war in Europe. One needs to ask whether the NATO weaknesses that Major Ledbetter perceives are not, in fact, calculated to force a potential aggressor to consider the NATO nuclear options in addition to their conventional capabilities. In essence then, the question is what does deterrence in Europe consist of and what is necessary to maintain that deterrence?

This letter has tried to use Major Ledbetter's article to raise some questions which appear to be critical for the United States and Europe. *ARMOR* constitutes a very good forum for discussion of these important issues. I would therefore hope that *ARMOR* would take it on itself to serve as the medium for presenting the problems and controversial solutions that one finds being printed today. This exposure is vital to all military and civilian decision-makers at all levels so that they can achieve a better understanding which will assuredly lead to tactical and strategic innovations.

BRUCE B. G. CLARKE
Captain, Armor

Fort Leavenworth, Kansas 66027

"Advanced Main Battle Tank"

Dear Sir:

I have the eerie feeling that the results of the truncated "Advanced Main Battle Tank" will follow me beyond the grave. Just when I thought the ululations had died down, Captain Bruce T. Caine "Dragoons and Hussars: Tomorrow's Maneuver Battalions" (*ARMOR*, November-December 1974) brought the matter of offensive and defensive systems up again — along with a number of other points worth comment.

First: For the record, I never, never intended to give the impression that the MBT is *purely* a defensive weapon. What I suggest is that its design should be aimed at improving its primarily offensive mission. To suggest that any economical or wisely-conceived weapons system should be so inflexible as to be purely offensive or defensive is certainly delusional, as Richard M. Ogorkiewicz and others have rightly suggested. Nevertheless, we (and others) have more than once fielded systems which, by virtue of their over-ambitious design — aimed at providing capabili-

ties for battlefield predominance in all situations — have been mired in mediocrity.

A "special-purpose weapon" seems to be the *bete noir* of many designers; but we are dealing with definitional imprecision as well as the stigma of generalization when we make this cautionary claim. If *TOW/TD* and *AMBT* are "special-purpose vehicles," then victorious armies have been deluding themselves for quite some time.

In short: if it shoots and kills effectively — even if it is somewhat more effective in one situation than in another — we need to weigh the overall effect of its introduction into combat rather than dismiss it as a "special-purpose weapon."

Second: Captain Caine's inventory of contemporary articles in this area, especially as it illuminates the recent fighting in the Middle East, is most apt. I would suggest a role for the *TOW/TD* in both Dragoon and Hussar units — particularly in the combat support elements which, as I understand the company organization, are to be armed with the frankly underwhelming *Dragon*. *Dragon's* range is in no way sufficient to provide the sort of antitank defense that one expects with *TOW*; and its bulk is not significantly less than the *TOW's*. While the *TOW/TD* is (I refuse to renege on the definition) designed essentially as a "mobile, defensive, direct-fire weapons platform," it is also quite capable of being employed in offensive roles such as the obvious ones of overwatch and flank security. It is a far, far cry from a 3,000-plus meter range weapon to one which reaches the end of its wire, literally, within grazing range of enemy tanks.

Third: Kenneth S. Brower's article "Armor in the October War," (*ARMOR*, May-June 1974) made what I consider an excellent point on suppression of infantry fires, suggesting that: "... an additional suppressive fire weapon, giving area fire capability in the 500-1,000 meter zone, such as an automatic fragmentation grenade launcher" might be of aid in meeting or formation close-security woes — a problem we tackled in Vietnam, interestingly enough, by procuring *M79* grenade launchers for the tanks — not in the hopes of literally thumping the enemy to death, but to cover the very close encounters in which an RPG-armed infantryman with surflet of *elan* and a steady finger can outmove a tank. A proven weapon already exists in the 400-meter range (projected with extended-range ammunition to the 500-

1,000 meter radius): the XM174E3 40mm automatic grenade launcher. I had the opportunity to test this device last year at the Armor and Engineer Board; it is available now, requires no external power source (its action and performance are reminiscent of a scaled-up PPSH submachine gun), can be man-packed if necessary to secure the vehicle during maintenance or provide security during E&E, and requires a special talent to induce a stoppage. It is one of those weapons which is *fun* to use and does its job as advertised.

Fourth: while I wish to thank those who steadfastly supported *TOW/TD* in the letters column, I must disassociate myself from the concurrent idea of a *TD* made by casemating the 105 gun in an *M60* chassis — a sort of “Jagd-sixty.” This is the answer of a desperate economy unable to produce enough conventional tanks for combat needs. “Stagflation” considered, this really isn’t our problem. Anyway, I would hate to be the one to ground-guide an *M60* chassis with an *L68* gun on board a *C5A*. (Note: this is not inconsistent with my January-February 1972 article in *ARMOR*, “The Mechanized Infantry Assault Gun” in which, with Captain Albert T. Bowen Jr., a casemated 152mm assault gun was proposed. The “MIAG” was quite a different thing, as Captain Bowen and I went to considerable pains to develop.)

And Last: I find myself in Captain Caine’s camp in all but two matters.

1. Since we can’t even get together on subdued insignia, the idea of a single combat branch seems quixotic. Besides, from the practical standpoint, a formidably vast array of hardware skills would be required. Standardization and intentional crosstraining in service schools should suffice. Anyway, if we consolidate now, we give some yet unglimped agitator cause to “liberate” tankers and cavalymen in 10 to 15 years.

2. The names proposed for the combined-arms formations have a great deal of dash, but there are hidden dangers. “Hussars” are (or were) light cavalry; perhaps “Cuirassier” would be more accurate in terms of missions and lineage. Worse yet, an army which can make “cupalo” out of “cupola” and twist “*machts nichts*” into “*mox nix*” will have a field day with hussar and cuirassier both, though in defense of Captain Caine’s position, the latter offers more alarming opportunities for mispronunciation.

TIMOTHY R. O’NEILL
Captain, Armor

Durham, North Carolina 27707

“Combined Arms Battalion”

Dear Sir:

I feel that I must take a few moments to jot down a thought or two, on two most interesting documents that have recently crossed my desk. Those documents being Major James E. Mace’s article, “The Combined Arms Battalion: Reality or Myth?” (*ARMOR*, July-August 1974) and TC 71-4-2, published under the joint sponsorship of the Armor and Infantry Schools.

First of all let me congratulate Major Mace on a fine article. He shows great insight in describing the type of battalion that will be needed to defeat the enemy in any terrain in which a tracked vehicle can operate, but in particular Europe and the Middle East. I do not agree with the proposed artillery battery being included as an integral part of the battalion. I would personally prefer a composite unit of track mounted 81mm and 107mm mortars, however this is but a minor point.

The real meat of the article in my opinion is not the final mix of infantry, armor or indirect fire support, but in the statements about flexibility, cross-attachment and unit integrity. On the battlefield of the future we can expect, as in the past, the commander that would employ pure tank or pure mech infantry to have a secret death wish. To be really effective, we must have an organization permanently structured that will employ our two finest battlefield assets, namely the firepower, mobility and shock action of the tank, and the tough, well-trained infantryman, who is prepared to show his credentials in the form of cold steel to the enemy.

When I have talked to many of my friends who have armor or mechanized infantry experience about this subject of cross-attachment, I receive the stock answers, answers which invariably say that in such and such a division or such and such a brigade, we always had the same tank or the same mechanized infantry company attached to us and it worked fine. Well, it probably did, but this is not true flexibility. What happens when a tank battalion that has habitually been assigned to the third brigade, all of a sudden, due to a combat commitment finds itself operating with the first brigade? They find themselves coordinating with all new people and more importantly playing with a whole new set of bylaws, the command policies and standing operating procedures (SOP) of a strange unit. We find ourselves dealing with unwanted coordination problems that could cause casualties in combat.

With the combined arms battalion we

would be habitually working with the same people and the same SOPs. A company commander would know how his mechanized infantry folks would react to a given situation in combat because he has probably worked out the same problem with them in training.

Field Marshal Rommel once said that “the best way to look out for the welfare of your men is to provide them first-class training.” We can carry this one step further and say let’s train them alongside the personnel and equipment that they must fight alongside. The combat arms battalion provides us the vehicle with which to accomplish this. We have the highly trained personnel, the equipment and the technology to form such a unit. All we need is the authority for reorganization. In my opinion, we should add such a unit to our troop structure on an experimental basis and try it. If it does not work we shall know better than to try it again; but it deserves a trial. This could be accomplished at very little expense by converting one of our existing battalions.

This brings me to the second document that I mentioned, TC 71-4-2. First of all let me make it perfectly clear that I have no argument with the tactical doctrine presented in this circular. This is the type of training literature that we have needed for years, the “nitty gritty” of how to inflict great bodily harm on the enemy and at the same time lower the possibility of one’s own skin becoming punctured by all those nasty little holes that lead and shrapnel have a tendency of making.

The only portion I question is in the conclusion of the document where it speaks of training techniques. They suggest that in order to train tank and infantry companies, one method that could be used is to have armored personnel carriers simulate tanks and have dismounted tankers simulate infantry. This of course is a good training technique, however the end result will be that the soldier will know what the field manual says is supposed to happen. All of us that have been assigned to combat arms units know that we must operate with the philosophy that anything that is left to chance will probably go wrong.

In conclusion, we must train as we fight and fight as we train. The combat arms battalion organized with tank and infantry components assigned on a permanent basis is a sound proposition and possibly a sound solution.

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THE COMMANDER'S HATCH

MG DONN A. STARRY
Commandant
US Army Armor School

MODERN ARMOR BATTLE III CAVALRY

In recent issues of *ARMOR* we have tried in this column to describe what we believe to be important characteristics of the modern battlefield; and how offensive and defensive military operations should be conducted in modern war. In this issue — some notes on cavalry in modern battle.

The Armor Center Team has completed an eighteen-month evaluation of cavalry — functions, organization and tactics. While some readers will have heard or seen first-hand some of what follows, most will not. And so the paragraphs following outline in broad terms findings of the cavalry study.

First, what is cavalry? What does it do? Why do we have it?

Our studies confirmed several important concepts:

- As with other combat maneuver forces, cavalry must use the combined arms. Mounted in ground and/or aerial vehicles, uniquely organized, equipped and trained, cavalry's missions are to find the enemy in order to prevent the friendly main body from being engaged under adverse circumstances, and to provide, within its capability, security for the main body.

- One of cavalry's basic tasks is to find the enemy. In modern battle it is essential that a force should find the enemy with the least force possible in order to avoid the higher losses to be expected in the first few minutes of a fight.

- Another basic cavalry task is security. In modern war security should be provided by a force tailored to leave the largest residual of combat power in the main body, in order that the main body can properly dispose to meet an enemy who should be expected to be numerically superior.

- Cavalry, therefore, should be a force uniquely tailored to satisfy the definition of *economy of force* — a principle of war. *Economy of force* is the use of minimum essential combat power in one area so as to insure sufficient combat power in some other area where a favorable outcome is critical. Cavalry is an *economy of force* force.

- Although cavalry's basic tasks are *reconnaissance* and *security*, it should be considered that most of the time cavalry will fight to accomplish its mission. Therefore, cavalry must perform reconnaissance and security using combined arms action in offensive and defensive operations within its capabilities.

And so it is that a description of how the cavalry platoon, troop or squadron conducts route, zone or area *reconnaissance*; advance, flank or rear *guard*; *covering force*; or *area security* missions will closely resemble our previous discussions about offensive and defensive operations, for the cavalry platoon conducting a route reconnaissance moves as if conducting a march to contact. Its movements should be contrived to conform to those all-important principles of movement in modern war — *terrain* and *overwatch*.

For the cavalry squadron operating as part of a covering force, the mission is basically defense. Here, appraisal of the threat, thorough knowledge of terrain, correct and clever use of ambush techniques to extract a maximum exchange ratio from the attacking enemy and timely attack to destroy the enemy are all important — just as important as they were to the maneuver battalion task force defending in the main battle area.

Now, how should cavalry be organized to accomplish its tasks in modern battle?

The armored cavalry platoon is the basic tactical cavalry element. It is a combined arms team trained to perform reconnaissance and security, and organized and equipped to participate in the offensive and defensive operations which are required to accomplish its mission.

The armored cavalry platoon growing out of our cavalry study is composed of a scout section and a tank section (Figure 1).

Scout Section

The scout section consists of the platoon headquarters and two scout squads of ten men each. Each scout squad consists of a squad leader, assistant squad leader, six scouts and two scout drivers. There are two vehicles in each scout squad, one mounting the TOW weapons system, one mounting an automatic cannon. In addition each scout vehicle has a machine gun for air defense and for high-volume suppressive fires. Two motorcycles are provided each squad to be used as auxiliary transportation for scout/messengers. The platoon leader's vehicle mounts an automatic cannon and carries a motorcycle.

The primary task of the scout section is to acquire and report information of enemy and terrain. The scout fights in self-defense; he may initiate an action when required for mission accomplishment.

In addition to collecting and reporting information, scouts are trained to create obstacles, use demolitions and/or mines and to acquire targets for destruction by

ARMORED CAVALRY PLATOON (CONCEPTUAL)

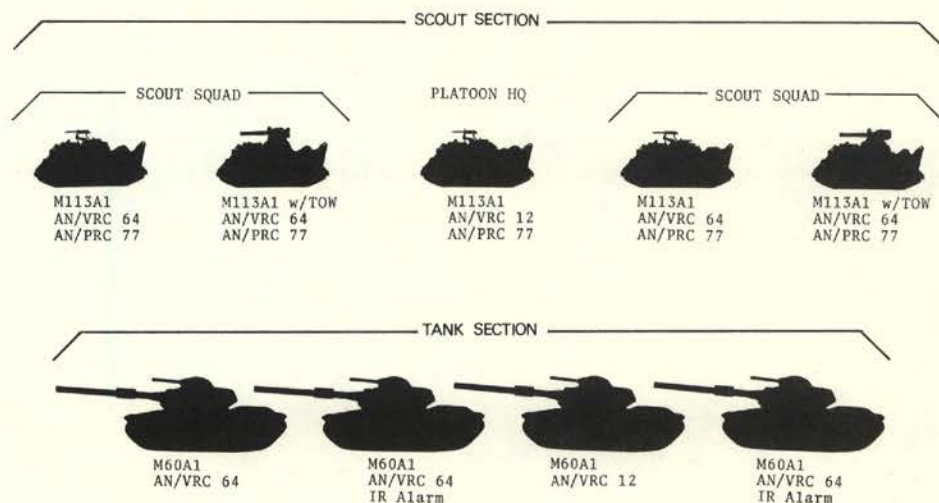


Figure 1

weapons systems other than those organic to the scout's platoon or troop. The scout is an integral part of a combined arms team.

Scout tactics range from stealth to fully-supported fire and maneuver, depending upon the strength and disposition of the enemy, and the mission of the scout's parent unit.





Tank Section

The section consists of four tanks. Each tank crew includes a commander, gunner, driver and loader. The platoon sergeant commands one tank and the section. The purpose of the tank in cavalry operations is to provide long-range, armor-protected direct fire.

Heavy Mortar Section

A mortar section of three heavy mortars (4.2-inch) mounted in tracked carriers is at troop level for close-in, prompt, indirect fire support for all troop elements. The mortars may also be employed by a squad; that is, with one or more of the platoons. In reconnaissance operations, mortars should be located to facilitate firing line-of-sight.

The armored cavalry platoon leader will organize for combat into two or more teams, dependent on mission, terrain, vehicle, availability and the availability of qualified leaders.

Normally the platoon will be organized into two teams (Figure 2). Team A consists of two scout vehicles; one with automatic cannon () and one with TOW (), two tanks () and the platoon headquarters. The platoon leader leads Team A. Team B, led by the platoon sergeant in his tank, contains the other scout squad and two tanks. The two-team organization facilitates control, accommodates battle losses and permits the formation of two mutually supporting strong points. The TOW-equipped scout vehicle () provides accurate, long-range antitank fires.

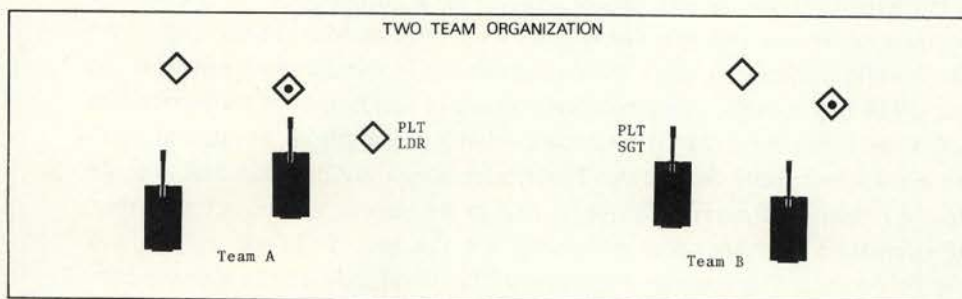


Figure 2

A three-team organization may be used if the platoon must operate over an extended front, conduct reconnaissance of multiple routes, or operate across open terrain. The three-team organization can be used only if sufficient vehicles are available to preclude any vehicle operating alone and only if sufficient qualified leaders are present.

With three teams, tanks deploy forward (Figure 3). Team A and Team B each consist of one scout and two tanks. Team C contains the two TOW-equipped scouts. The platoon leader is free to move with whatever team he chooses. De-

pendent on terrain and enemy weapons, this organization might be employed in an attack using the TOW weapons in overwatch.



Figure 3

The platoon may also organize three teams with tanks consolidated (Figure 4). Teams A and B each consist of a scout squad. Team C, all four tanks, is led by the platoon sergeant. The platoon leader is again free to move as he wishes.

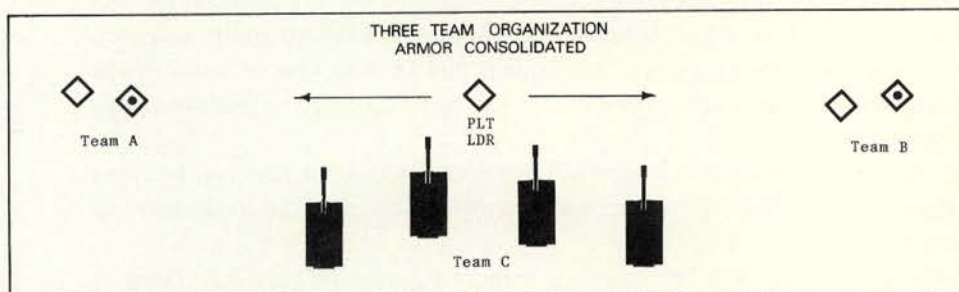


Figure 4

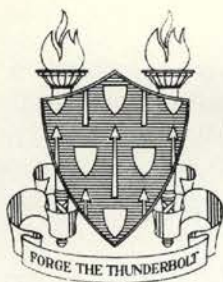
The organization described above is conceptual — it is the result of much study; it has yet to be tested, and testing may result in changes. However, its basic framework appears sound, and it should provide the basic for evolutionary development of cavalry organization to meet demands of the changing battlefield.

Finally, how about cavalry tactics?

Since cavalry should expect to fight to perform its mission, the character of the modern battlefield affects cavalry tactics exactly as it influences all other tactics. The principles of *terrain* and *overwatch* govern movement. Maximizing one's own capabilities while minimizing one's own vulnerability is the cardinal principle. In May-June 1974 this column contained descriptions of techniques of movement for combined arms formations; we believe these techniques apply to cavalry as well, therefore we will not recite them here. The reader need only be reminded that the principles of *terrain* and *overwatch* apply; that in movement to contact *traveling*, *traveling overwatch* and *bounding overwatch* are the rule, followed by *fire and maneuver* on contact. Our January-February 1975 description of the *defense* contains principles which apply to cavalry in covering force and retrograde operations.

And so with this description of cavalry we complete our analysis of the modern battlefield, its dimensions and characteristics and how we must operate on it in order to survive and win.

Don Mastany



FORGING THE THUNDERBOLT

LIGHTNING STRIKES THE SCHOOL BRIGADE

In recent reorganization of activities at Fort Knox, the prosaic School Brigade has been transformed into the dynamic Lightning Brigade. The Brigade is no longer solely an administrative unit chiefly responsible for the administration and logistical support of the students, staff and faculty of USAARMS. By the acquisition of 2d Squadron, 6th Cavalry, and 4th Battalion, 37th Armor (which formerly were a part of the 194th Armored Brigade), the Lightning Brigade has been converted into a more dynamic, more responsive and more flexible unit. Simultaneously, tanks, tracks and troops have been united under one chain of command in the conduct of training within the Armor School. The brigade commander is Colonel Robert E. Ley.

Prior to reorganization on 1 February 1974, the personnel and equipment to support training in the Armor School was provided by the 194th Brigade. Unfortunately, as student officers and soldiers were not responsible for the equipment, and as those who were responsible did not accompany the tracks during field training, there was a natural tendency to subject the equipment to unusual wear and tear. The result of this lack of joint concern and responsibility was excessive equipment down-time for maintenance and repair, and some very unhappy, often incensed, troopers in the 194th. Nor was this a happy situation for the students. Not only were they not learning to be responsible for the consequences of their actions, but they were not being trained by the men who should be most qualified to train them on the specific item of equipment, i.e., the assigned crew.

Under the new organization, the crew as well as the command and control structure of the unit accompanies the equipment on all training missions. As a result, students are receiving more effective training than previously, and instances of equipment misuse have declined markedly. The impact of this improved supervision over equipment operation and

maintenance by the students is dramatically demonstrated by the fact that equipment availability is now running consistently above 80 per cent — a very significant increase over the previous state of maintenance.

As much of the Brigade's equipment is in almost constant use for training purposes, one can readily see that finding the time and hands to provide the necessary maintenance is a difficult problem, but a problem that is being solved. The Brigade still uses Todd Hall, and the Track Vehicle Mechanic (TVM) students pull quarterly services. Motor Officer students also perform Q and S services on Brigade equipment. Officer and NCO students who use the tanks, tracks, trucks and guns are now the operators who help clean, service and repair that equipment. The students associate with trained troops in a realistic training environment. The student gets hands-on training, and the Brigade troops get a deserved boost in maintenance by the user.

To compensate for increased equipment usage resulting from more hands-on training, the system of maintenance support has been restructured. Lightning Brigade formed the Maintenance Division consisting of the Technical Assistance Branch, the Maintenance Branch, and the Repair Parts Supply Branch. The Division coordinates all requests for support maintenance, conducts inspections of Armor School vehicles and equipment, provides organizational maintenance support to the Automotive, Weapons and Leadership Departments, and provides organizational repair parts for all Armor School vehicles and equipment. This latter function has been facilitated by incorporating the three unit repair parts sections into the single, central, consolidated repair parts facility organic to the Maintenance Division. Consolidation reduced the total number of line items from 6,000 to 2,155 without any decrease in the availability of types or quantities of repair parts required by the using units. Parts are better managed and are readily located. The facility, since its organization, has processed an average per week of 2,000 requisitions, with an estimated value of \$20,000. Since the establishment

of the Brigade Maintenance Division and consolidation of repair parts supply activities, the Armor School has experienced a steady improvement in the quality of maintenance and in the quantities of vehicles and equipment available for instruction and student use.

The marked improvement in the attitude and morale of the Armor School troopers is equally apparent. Participation in School training requirements offers heretofore unattainable opportunities for the individual soldier and to the unit to train. The Brigade's platoon leaders and tank crewmen are now a part of School gunnery, tactics and maintenance instruction. They are operators and assistant instructors. The young officer and NCO in the Lightning Brigade has a better opportunity to learn how to train all armor skills than do his counterparts in many TOE units.

To create a school unit which exemplifies the spirit of armor, a demonstration tank platoon was formed in December 1973. The platoon has six tanks and 23 men, all volunteers. Its primary mission is to demonstrate the functions of a tank platoon in tactics, gunnery and maintenance; and it is to travel throughout the Continental United States for demonstrations. Similar demonstration cavalry and infantry platoons have since been formed to provide a cavalry and an infantry model as well.

While the School troops have always played a vital role in forging the thunderbolt, the charter of the new Lightning Brigade has made every School trooper a trainer. He is now a member of the faculty of the Armor School.

Today, the Lightning Brigade is a much more exciting and challenging place to be assigned. In fact, under this new organization, service in the Lightning Brigade can be a feather in the cap of any officer or soldier; and those who have completed a tour with the "Guide on Me" Brigade will be eagerly sought by other units. School troopers are now acquiring the reputation of being trained armor professionals.

THE TANK TEAM

A good tank crew must operate and function with the same snap and precision of a championship football team. Crew responses to initial and subsequent fire commands must be automatic and immediate. No hesitancy, delay or doubt can be tolerated. Perfect execution and split-second timing in the turret spells the difference between victory and

a sudden section transfer to QM's graves registration.

Achieving this high state of crew training is easily within the grasp of every tank unit in the Army. In words of one syllable the secret is, drill, drill, drill and then more drill. *Tiresome? Boring? Monotonous?* Perhaps, but effective!

The crew should be tuned to the degree that they can function automatically (but not without thinking) in response to a threat and the fire command necessary to engage it.

Thirty minutes a day of concerted effort will produce the desired results. When the crew can function so quickly and efficiently that they can engage the target within 10 seconds, they have acquired the skills necessary for survival on the battlefield.

COAX MACHINE GUN PROGRAM

As a result of frequent complaints from the field concerning the performance of the *M219* tank coax machine gun, the Armor School in conjunction with Armaments Command, the developer, is involved in a joint effort to identify the best coaxial machine gun available. Weapons currently being evaluated include the standard *M219 Product Improved*, the *M60E2*, the Canadian *C1*, the British *L8A1*, the German *MG3* and the French *AAT52 7.62mm* coax machine guns. The Cal .50 *M85* and *M2* heavy machine gun are also being examined.

The evaluation has two concurrent testing programs; operational and engineering testing.

Operational testing is being conducted by the Armor and Engineer Board at Fort Knox on the *M219*, *M219 Product Improved* and the *M60E2*, a modified *M60* machine gun. At this time firing has been completed on the *M219* and *M219 Product Improved*. Preliminary results indicate the product improvements on the *M219* have not been as successful as anticipated. The operational test includes the requirement that 50 per cent of all firing be conducted from moving tanks to insure that the vibration and shock of the tank is imparted to the test weapons. The tankers being employed to conduct this user test are members of the Lightning Brigade of the Armor School.

Engineering testing of the foreign weapons is being conducted at Aberdeen Proving Ground to determine their operating characteristics for Armaments Command. Only the most promising foreign weapon will be forwarded to Fort Knox for operational testing.

At the conclusion of testing at Fort Knox and

Aberdeen Proving Ground, a joint user and developer council will determine which machine gun should be used on the present US tank fleet; or what additional testing of various candidate weapons will be required to establish the data base necessary to support procurement of an improved tank coax machine gun. The success of this program will improve the combat capability of all Armor units.

COMMAND AND STAFF DEPARTMENT ACTIVITIES

In addition to the presentation of resident instruction, the Command and Staff Department is responsible for the preparation of tactical training literature. The Department recently wrote, demonstrated to TRADOC and FORSCOM commanders, and distributed to Armor units worldwide the following training circulars:

Tank Platoon Organization for Combat and
Techniques of Movement *TC 17-15-3*

Armored Cavalry Platoon Organization and
Techniques of Movement *TC 17-36-2*

Tank/Mechanized Infantry Team *TC 17-4-2*

The Department is currently preparing training circulars for the "Tank Platoon in the Defense," "Tank Platoon in the Delay," "Tank and Mechanized Infantry Team in the Retrograde," and the "Tank-Mechanized Infantry Task Force." Both the team and task force circulars are being prepared in conjunction with the Infantry School. All are scheduled for completion by 30 June 1975.

The USAARMS Research Writing and Speaking Program provides the AOAC students with an opportunity to study and propose solutions to "real life" dilemmas on the modern battlefield for which current doctrine has no clearcut answers. It has also provided the Department with some fresh, original ideas on a variety of "thorny" tactical problems. For example, one student committee proposed the extensive use of smoke rounds by the overwatch element and on-board grenade launchers as an Armor unit defensive measure against the antitank guided missile threat. Another student committee is preparing a proposed (ARTEP) Army Training and Evaluation Program for the armored cavalry squadron. Another committee's study on the best method to control the mortars organic to the armored cavalry troop has proven an excellent source material for the USAARMS study group currently revising FM 17-36.

544TH SUPPLY AND SERVICE BATTALION SUPPORTS "LEADERSHIP TRAINING"

The 544th Supply and Service Battalion of the 194th Armored Brigade supports the leadership department of the US Army Armor School each week that a Senior Commander Officer Orientation Course (SCOC) is conducted. The one-week course is designed to prepare senior field grade officers for battalion or brigade command assignments.

The 544th participates by hosting interested SCOC students to a mid-week afternoon tour of the battalion maintenance activities and a seminar discussion with the battalion commander. The tour includes a walk through the shops with briefings by the shop officers of the maintenance units. It also highlights both the capabilities and the mission-related problems of a support maintenance company. Through this tour, many of the future battalion commanders gain an appreciation of the continuous effort required in maintaining Army materiel.

Training management is one area among many which has received a great deal of attention in the seminars. Another area discussed includes the 544th's effort to improve field operations by initially conducting Saturday training when all personnel can train together as a unit. Lieutenant Colonel Donald E. Gaunter, commander of the 544th, also discusses the importance of following through with hands-on training under field conditions for all-out unit training in a maintenance support role to greatly improve the readiness of the unit.

Efforts to improve reenlistment and officer retention programs, principal concerns for a battalion commander, are illustrated. Special activities for enlisted personnel, such as ladies' day where the enlisted wives receive guided tours of their husbands' unit, have helped to encourage family understanding of on-the-job Army life.

An innovative new officer orientation program designed to prepare newly assigned second lieutenants for their first battalion assignment is also explained.

Many other areas relating to command and control of a battalion commander's area of influence are offered for discussion. It is with this combined effort of tours and seminars that the "Support the Force" Battalion assists the leadership department of the Armor School. □



THE ARMED HELICOPTER

by Captain Richard S. Van Pelt
and Captain Douglas H. Madigan

-WHAT'S NEXT?

Armor's current fascination with mid-intensity warfare and its effects on armed helicopter employment has been interesting, if not thorough. The two-dimensional environment dictated by numerous accurate antiaircraft weapons systems has oriented most thinking toward the antitank role. We can no longer ignore the distinct possibility of helicopter-versus-helicopter aerial combat.

The evolution of the airplane and the helicopter as military weapons has been very similar. World War I initially saw the airplane used for reconnaissance, artillery adjustment and limited bombing. Opposing pilots began to shoot at each other with pistols, rifles and shotguns in an effort to prevent enemy mission accomplishment. Machine guns were mounted and aerial combat began in earnest.

While airplane performance has increased to supersonic speeds and the single machine gun has been replaced by multiple guided missiles, tactics have remained essentially the same. This is not be-

cause of apathy in the Air Force; the principles of successful aerial combat are timeless in the same sense as the principles of war.

Helicopters were first used in a military role in the Korean War for reconnaissance, artillery adjustment, medical evacuation, troop transportation and resupply. Various machine guns and rockets were mounted and the helicopter saw additional action in Vietnam attacking enemy troops and equipment. Why didn't aerial combat between helicopters occur? Both sides employed helicopters but the North Vietnamese used relatively few and limited their operations to an area beyond the normal mission range of American helicopters.

Every modern Army in the world is using helicopters in ever-increasing numbers. Performance and weapons have improved and tactical theory indicates that the helicopter can be successfully employed, even behind enemy lines. These developments make helicopter aerial combat inevitable.

Although the Soviet Union is not our enemy *per se*, it is highly likely that any enemy we face will use Russian tactics and equipment, such as the highly versatile *MI-24 HIND*. The wing stores on this helicopter carry conventional rockets and several *Swatter* or *Saggar* antitank missiles. A 23mm cannon is mounted in the nose turret and the *HIND* can also carry a combat-equipped infantry squad or slingload an artillery piece.

Russian tactical doctrine indicates that the *HIND* will usually be employed in a defensive role behind the *FEBA* to contain armor penetrations or to augment the antitank capabilities of thinly screened areas. The *HIND's* ability to carry a combat-equipped squad in addition to its armament also makes it an important part of Soviet *desant*¹ operations. Such operations have been conducted from squad to division level and are an integral part of Soviet strategic and tactical doctrine. To limit their effectiveness we must be prepared to counter such an assault with all available means. The attack helicopter offers a highly mobile defense against *desant*, particularly if our high performance aircraft are unable to counter it.

Our attack helicopters can be very effective in a mid-intensity war when they conduct raid operations behind enemy lines. The Soviet Army uses a large number of helicopters in combat service support and logistics operations and it is a certainty that we would encounter them on a raid.

Whether we are countering a *desant*, conducting a raid, screening the flanks of a friendly armor penetration or performing any other mission we must know what to do and how to do it when we encounter an enemy helicopter. The advanced attack helicopter will possess improved armament and performance but a realistic estimate cannot foresee it operationally deployed before the mid-1980s. It is evident that we must train to meet the threat with our *AH-1* family of helicopters.

There is very little practical experience from which to develop helicopter-versus-helicopter aerial combat tactics. Eddie Rickenbacker, Roland Garros, Manfred Von Rictofen and other legendary pilots were faced with the same problem that we are faced with today — how do you rapidly kill an enemy aircraft? An analysis of history and current US fighter doctrine gives us the following important principles:

¹*Desant* — A Russian word meaning "a body of troops trained specifically for landing operations on enemy-held territory."

• **KNOW YOUR WEAPONS** — World War I ace Billy Bishop maintained that this was paramount to success in combat. Unfortunately, in an attack helicopter we cannot work on our guns with a screwdriver in the middle of a fight as he did. We can at least know the characteristics of our weapons systems and be able to troubleshoot and make minor repairs. The professional pilot cannot rely solely upon the armorer. If a stoppage or failure to fire occurs, you should land in a secure area, repair the system and continue with the mission.

A surprisingly large number of attack helicopter pilots do not know the effective ranges of the weapons mounted on the *AH-1G*. A successful aerial combat pilot must know these effective ranges and plan his tactics with them in mind. If you open fire at too great a range you will accomplish nothing but to warn the enemy and waste ammunition.

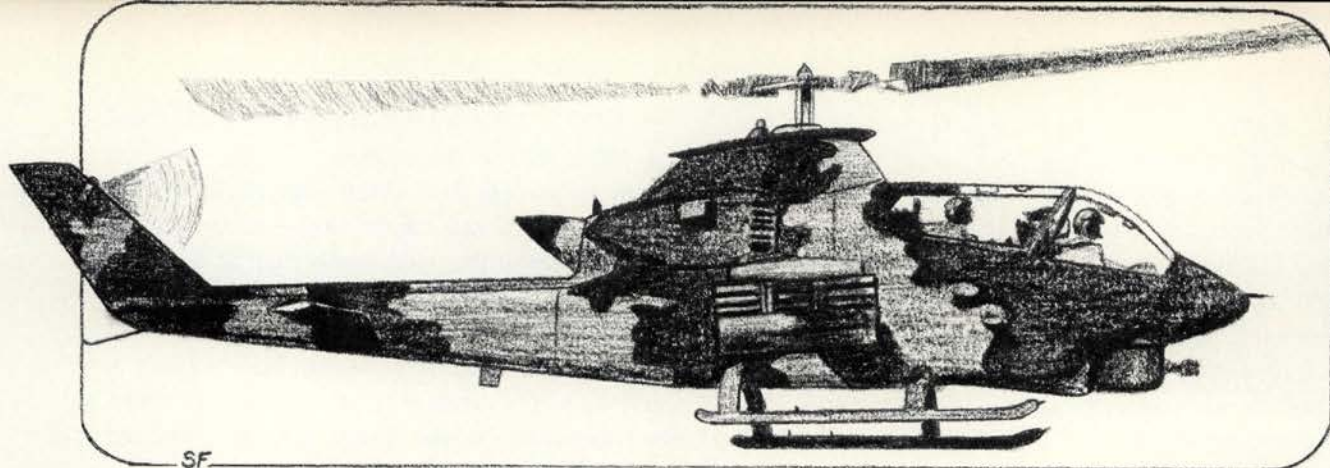
• **KNOW YOUR AIRCRAFT** — The knowledge of the limitations of your aircraft and your ability to fly it must become second nature. In aerial combat you don't have time to think about how to fly the aircraft — you just react. You must be trained to the point where you have complete confidence in your aircraft and your ability to fly it.

A "Nap of the Earth" (NOE) qualified pilot must be constantly alert, able to accurately navigate under the most adverse weather conditions, and able to use available cover and concealment to increase his survivability. He must also be a master of "what if?" *What if I receive fire here? What will I do, where will I go and how will I get there?* All of these must be second nature and not take up an inordinate amount of the pilot's concentration.

Monetary constraints and the lack of adequate training areas are certainly obstacles to effective NOE training. The aviation commander can minimize their impact through imaginative, intelligent planning and supervision.

• **KNOW THE ENEMY** — A thorough knowledge of enemy helicopter performance characteristics, weapons and tactics is essential. With this knowledge you can avoid placing yourself in a poor position and you can exploit the enemy's weaknesses. One such weakness is the lack of self-sealing fuel cells on all Russian helicopters and another is relatively low maneuverability.

Performance characteristics are very important. If the enemy is faster than you are, you must carefully choose the time and place for engagement and realize that you cannot break off the engagement unless he wants to. Conversely, if you hold a speed



advantage, such benefits are yours. A knowledge of size is also important because it makes range estimation easier.

Every aircraft has some spots that are more vulnerable to weapons fire than others. Vulnerable spots must be identified and used as aiming points. During World War II fighter pilots usually knew the spots and concentrated their fire on them to get the quick kill. If the vulnerable spots were unknown, the enemy pilot was used as an aiming point, not only to kill him but to aid proper lead.

- **PLAN THOROUGHLY** — Preflight planning determines the success or failure of many missions. The location of friendly and enemy units, antiaircraft weapons positions and the tactical situation are essential information. Once the enemy has been spotted this information may influence your course of action and save your life. You should not pursue the enemy helicopter into enemy territory because this exposes you to ground fire. If you are being pursued, attempt to lead the enemy over known friendly antiaircraft positions.

- **USE PROPER MOVEMENT TECHNIQUES** Helicopters flying NOE can more effectively accomplish their mission if they employ armor and mechanized infantry overwatch movement techniques. These techniques are readily adaptable to helicopter tactics and will increase security by providing early warning and permitting rapid reaction when fire is received. When flying with other helicopters every effort must be made to spread out. This reduces the possibility of being observed by enemy helicopters and provides better fire support coverage. As with airplane wingman and escort principles, it facilitates the escape of unarmed aircraft and gives the armed helicopter time to analyze the situation and take effective action.

- **USE THE SUN TO YOUR ADVANTAGE** — Attacking out of the sun with your guns blazing is hardly possible in an NOE environment, but the sun is still an important consideration. When the situa-

tion permits, the crucial phases of a mission should be planned so the sun will be at your back. It is far easier to spot an aircraft looking away from the sun than looking toward it. If you see an enemy helicopter during early morning or late afternoon and plan to attack you should maneuver to attack with the sun at your back. This reduces the probability of your detection and assists you in closing to the most effective range of your weapons before firing.

Shadows caused by the sun shining on a hill or tree line can minimize glint and effectively conceal one helicopter from another. They should be carefully searched before moving forward.

- **SEE THE ENEMY FIRST** — Constant vigilance is required if you intend to survive. Seeing the enemy helicopter first enables you to maneuver for a good firing position and take advantage of surprise. Crew search patterns must be developed and practiced and a pair of binoculars should be carried in the cockpit. Binoculars are very helpful with long range target identification and can confirm a target long before the naked eye. Early identification of the enemy gives you the advantage in maneuvering for the kill.

Don't look away after you have spotted the enemy. It is very easy to lose visual contact with a helicopter, especially at longer ranges. If you lose contact, he may be firing at you the next time you see him.

- **INFORM OTHERS** — When you spot an enemy helicopter, don't keep it a secret. Everyone in the flight needs to know where, what type, its flight path and your intentions. Work as a team within your crew and the flight to track the enemy once he is spotted.

- **FIGHT TO WIN AND SURVIVE** — Many little details give success or failure in aerial combat.

Historically, altitude or height advantage has controlled the air battle. Altitude becomes a two-edged sword in mid-intensity warfare helicopter battle. Altitude can be traded for airspeed and increased

maneuverability in a battle and it enables you to fire more accurately in a dive. Conversely, it makes you easier to spot against the sky and may expose you to enemy antiaircraft fire. These advantages and disadvantages should be carefully weighed before seeking the height advantage.

The formula for success used by many aces was — *clear yourself, close with the enemy and shoot well*. Many pilots have been lost because they did not properly clear themselves of attacking enemy aircraft before they attacked. The enemy also employs helicopters in pairs and it is wise to locate the wingman before attacking.

Good air-to-air gunnery tends to be a function of range. Many successful fighter pilots were not good shots but, before firing, closed with the enemy to a point that they couldn't miss.

Don't attack an enemy helicopter from a hover. Gain airspeed to increase the accuracy of your weapons and give yourself more maneuverability.

What should you do if the enemy attacks first? The relatively slow speed of helicopters tends to make tight turns and other violent evasive maneuvers futile at ranges beyond 200 meters. A more effective maneuver would be to immediately seek cover behind a ridge or treeline and turn to meet the enemy head-on.

A low cloud layer can provide effective defensive cover when chased by the enemy. The cloud breaks visual contact and dissipates your infra-red signature if a heat-seeking missile is fired at you.

• **BE AGGRESSIVE!** Above all else you must be aggressive. In his book *The First and the Last*, the commander of the Luftwaffe, Adolf Galland, believed that "Only the spirit of attack borne in a brave heart will bring a success to any . . . aircraft no matter how highly developed it may be." "When in doubt — attack!" is an axiom of US Air Force

fighter tactics and, as with the tank duel, statistics prove that the one who fires first is usually the winner of an aerial duel.

These principles which we have discussed are all worthless without an aggressive spirit. We must abandon the "wait and see" attitude and train now for helicopter aerial combat.

The *AH-1G* does not have the best armament available for aerial combat. The primary mission of the *AH-1G* remains ground support, but the capability to rapidly add on an *AIM-9 Sidewinder* or *Redeye* missile system would significantly increase the effectiveness and survivability of the *AH-1G* against high performance aircraft and helicopters. Those who do not wish to sacrifice antitank capability for air-to-air capability would do well to re-examine the dual role of the modified *Redeye* or *RAM* concept.

TC 17-37-1, *Training the Air Cavalry Troop in Battle Drill*, suggests that the armed helicopter continue with its mission when an enemy helicopter is sighted. It also states that you should only fight when high performance aircraft or air defense weapons cannot destroy the enemy helicopter and he attacks you or threatens your mission accomplishment. Such thinking could well be disastrous in a mid-intensity war.

Taking the initiative and attacking the enemy is rarely a time-consuming affair. Even if you do not destroy him, your attack may well damage his aircraft or divert him from the accomplishment of his mission. We should alter our concept of helicopter engagements from a defensive to an offensive role.

The threat and the challenge are all too real and evident. Effective helicopter-versus-helicopter aerial combat tactics should be developed and crews trained now. It may well be the most important aspect of aviation training today.



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RIVER CROSSING— Key to the Modern Battlefield?

by Captains Eugene D. Betit
and Russell W. Barry



It has become axiomatic, in the light of modern technology and nuclear weaponry, that maneuverability and dispersal capabilities are essential for a modern army's survival, much less its victory, in any future large-scale conflict. In the European theater in particular, with its extensive system of rivers and waterways, river crossing is an unavoidable and crucial aspect of tactical operations. As the Egyptian Army's crossing of the Suez Canal in the face of fierce Israeli opposition in the October War demonstrated, river crossing operations can be decisive in modern combat. At present there are significant differences in US and Soviet doctrine, equipment and capabilities in this area. To assess these differences, a comparison of current Soviet and US doctrine and equipment will be made. Soviet capabilities will be emphasized only because they are generally less well known in the West.

Soviet strategists place considerable emphasis on the maintenance of rates of advance as high as 100 kilometers per day to insure success on the modern (particularly the nuclear) battlefield. The chief of Soviet tank forces told a Western observer in 1966 that the Soviet Union possessed the capability to overrun Western Europe, with or without the use of nuclear weapons, in 10 days. Soviet planners are well aware that, in Europe, rivers up to 100 meters wide are encountered every 35 to 60 kilometers, water obstacles between 100 and 300 meters wide are found every 100 to 150 kilometers, and every 250 to 300 kilometers water barriers greater than 300 meters in width will be encountered.

But even this does not adequately describe the demands made by large forces crossing a single obstacle at many points along a broad front. One must also consider the requirements of reinforcing logistical and other rear echelon units who will need extensive bridging in rear areas, even in the face of a hostile air environment. Soviet military literature

indicates that river crossing methods and techniques are emphasized in training programs at all echelons, and river crossing operations are known to have been prominent features of all Warsaw Pact exercises in recent years.

Soviet tactical doctrine insists that water obstacles be crossed in strength from the march, without pause or interruption of the advance, at multiple points along a broad front. One historical example serves to illustrate this principle: during World War II, Marshal I. S. Koniev's forces crossed the Dnieper River at 18 different bridgeheads. Although seven bridgeheads were destroyed, the remainder guaranteed the success of the Soviet offensive by causing the Germans to dissipate their forces while attempting to reduce each bridgehead.

A more recent example of this tactic on a somewhat reduced scale occurred during the Warsaw Pact exercise "Oder Neise," held in the fall of 1969. An attacking East German motorized regiment crossed the Warta River in Poland from the march, with the APCs of the motorized rifle battalions crossing at one point, the tanks snorkeling at another location, and the unit's wheeled vehicles crossing over a pontoon bridge rapidly erected at yet a third point. All of these operations occurred simultaneously under the cover of Polish air cover and Soviet fighter aircraft. According to *Soviet Military Review*, the pontoon bridge was constructed "three times faster than envisioned by standard practice" (the Soviet "norm" is seven to eight meters per minute), while the entire regiment completed the crossing operation in "several tens of minutes." The article also mentioned that a Czech battalion and its jeep-mounted recoilless guns were helilifted across the river when "enemy" resistance stiffened.

Use of airborne or airmobile forces often plays a prominent role in both Soviet and US plans for a

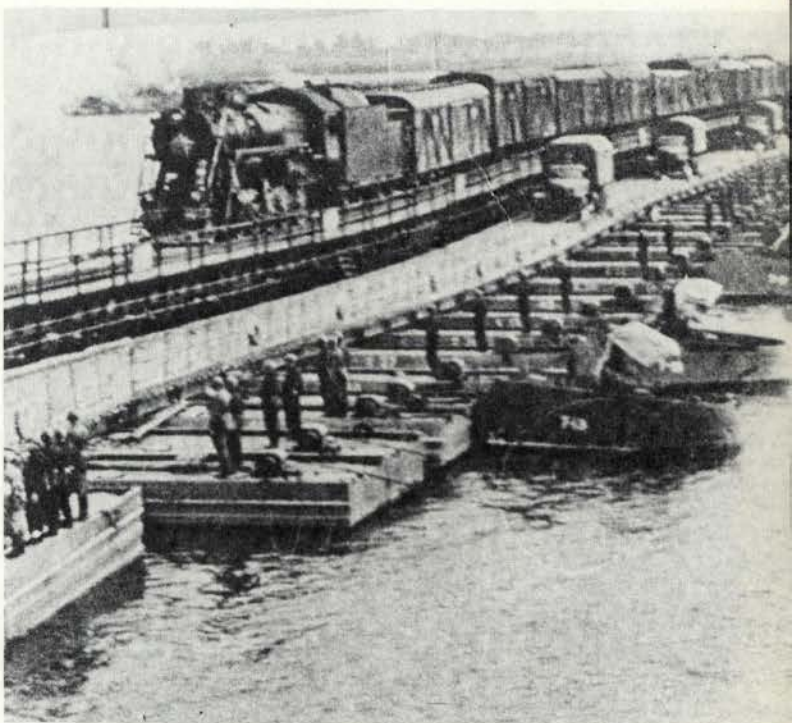
river crossing operation, particularly for the seizing of bridges or likely crossing sites in the rear of a retreating enemy. Such forces may also be used to establish blocking positions which prevent the movement of reinforcements into sectors in which assault crossing operations are taking place. Soviet and US doctrines envision that an air-transported force would be landed on both sides of a potential crossing site in enemy territory. Both doctrines stress that this may be accomplished immediately following a nuclear strike designed to annihilate enemy forces deployed in the area or against enemy reserves moving toward the crossing area. In some cases, bridging materials will be lifted in by helicopter so that the crossing will be prepared by the time these forces fight their way to the objective. Whenever Soviet airborne or airmobile forces are used to seize an advance bridgehead, they will survey suitable areas for tank snorkeling, ferrying sites and APC crossing areas, as well as sites for the emplacement of pontoon bridging. Such sites will be several kilometers apart to avoid presenting a lucrative nuclear target.

Marshal of the Soviet Union V. I. Chuikov has written, "At the present time there is no need for Soviet troops to consolidate bridgeheads after crossing water barriers. They continue to develop the attack without stopping." Whenever possible, Soviet doctrine stresses the destruction of opposing forces along the approaches to water obstacles to prevent their withdrawal to the opposite bank. However extended their position or urgent the need to refit, Soviet units are instructed to lodge a bridgehead in enemy territory before stopping for resupply.

In order to permit more rapid advance across multiple water barriers, Soviet writings call for greater use of helicopters to transport pontoons and other bridging equipment to crossing sites. Mention has also been made in Soviet military literature of research in the construction of pontoons made of plastic and other chemicals, indicating that Soviet research and development efforts undoubtedly continue in this field.

US tactics recognize two basic types of river crossings — hasty and deliberate. The hasty river crossing is a planned operation as a continuation of the attack. The hasty crossing is feasible when the enemy defenses are weak, when friendly weapons are available to disrupt enemy defenses, and when appropriately equipped forces are available to advance rapidly to the river. A deliberate crossing is required when enemy defenses are very strong, the

"... Western observers have witnessed Soviet engineer units construct 300-foot bridges in as little as five minutes."



Soviet NZhM-56 supporting simultaneous rail and wheeled traffic.

current is severe, a hasty crossing has failed or offensive operations are resumed at the river line. It is characterized by detailed planning, deliberate buildup and preparation, delay at the river line, deception and clearance of enemy forces from the near bank.

Using the above definitions it is rather easy to predict that the majority of US operations in the European theater in the near future will be of the deliberate type. Further, assuming the battlefield of any protracted conflict will be nuclear, it will be critical to reduce to an absolute minimum the number of personnel and amount of equipment required to emplace the rafts and bridges necessary for a crossing. For most major river crossing operations at the present time the Army must rely on Mobile Assault Bridging (MAB) found in the divisional engineer battalions and the *M4T6* and *CL60* bridge sets located in corps- and army-level float bridge companies. This means that the US commander has the organic capability to cross division loads very rapidly. However, the division has only enough

MABs available to make one 149-meter bridge or four 6-unit rafts. At the same time corps- and army-level float bridge companies will be preparing additional crossing sites which will be available three to five hours after the start of construction for an average stream width of 100 meters.

To insure the continuance of a rapid advance, the Soviet commander employs a variety of water crossing means. By far the most rudimentary method is the improvisation and use of any material that will float by combat units to ferry equipment and personnel. According to a recent article in *Soviet Military Review*, military applications of swimming and hastily improvised means of crossing water obstacles are still taught to all Soviet troops, particularly since numerous operations in World War II owed their success to such instruction. Ryan's *The Last Battle* contains an extremely vivid paragraph describing the methods used to ford the Oder River prior to the Red Army's final drive to Berlin: "... soldiers dived in, fully equipped, and began swimming the river. Others floated across clutching empty gas cans, planks, blocks of wood, tree trunks — anything that would float . . . The Oder was swarming with boatloads of men, rafts full of supplies, log floats supporting guns. Everywhere were the heads of men, as they floated or swam across."

Admittedly, such methods alone would not likely result in the rapid neutralization of the opposition envisioned by Soviet planners, and the inherent snorkeling, amphibious or fording capability of Soviet tanks, APCs and other vehicles is a far more significant asset. The basic APCs of Soviet front-

line motorized rifle and tank divisions, the eight-wheeled *BTR60P* and the tracked *BTR50P* respectively, are both powered by a hydro-jet propulsion system while in the water. The *BRDM*, the Soviets' basic reconnaissance vehicle, which also serves as a carrier for the three Soviet antitank guided missile systems, makes use of the same type propulsion. There is also a turreted version, *BRDM2*, mounting both a 14.5mm and a 7.62mm machine gun, which is being seen in increasing numbers in recon units. Russian reconnaissance forces are also equipped with the highly efficient, if lightly armed, *PT76* amphibious tank, which mounts a 76mm main gun. Although the *PT76* also has hydro-jet propulsion, the Soviets' revolutionary armored amphibious infantry combat vehicle, *BMP*, is able to propel itself while in the water only by means of its tracks. As a result, the *BMP's* water traveling speed is about six kilometers per hour, as compared to ten or more kilometers per hour for those vehicles employing hydro-jet propulsion. Preparation times for amphibious operations, if any, are minimal in all cases, facilitating the Soviet doctrine of attacking from the march.

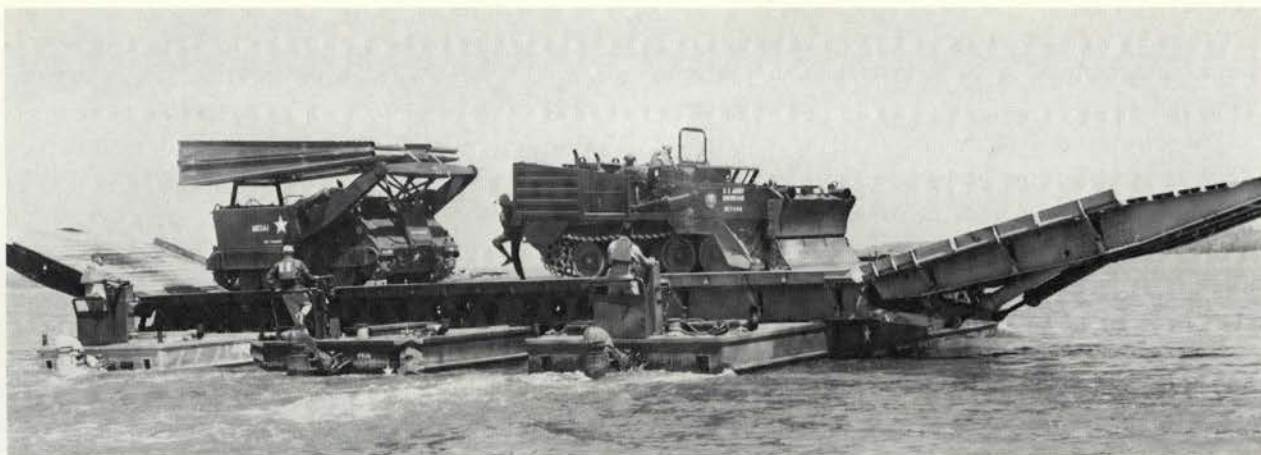
With the apparent retro-fitting of earlier model *T54* tanks, it appears that all tanks employed by Soviet troop units have been snorkel-equipped, and Soviet units routinely ford in water up to 5.5 meters in depth. A snorkel tube which supplies air to the tank crew and engine is mounted on the turret forward of the right hand hatch in place of the loader's periscope. During the march it is usually mounted in sections on the rear or side of the tank. In the course of an assault crossing, directional control of the tank while submerged is provided by radio from shore-based command stations, or by following an azimuth on the tank's gyrocompass.

For training purposes only, the Soviets also mount a larger diameter "chimney" tube which permits the tank commander to remain with his head above the water to direct the crossing. This "chimney" also provides a psychological boost to inexperienced tankers, snorkeling for the first time, since it also doubles as an escape hatch. Time required to prepare the tanks for underwater crossing varies for different models, ranging down to 15 minutes. US armor units do not currently possess such a capability, although the West German *Leopard* tank does.

Soviet engineering support of crossing operations begins with mobile assault bridges, both tank and

Two Soviet GSP sections enter the water.





The US Mobile Assault Bridge-ferry (MAB)

truck launched. Both bridges are organic to the engineer companies of tank and motorized rifle regiments. They are employed to overcome canals, ravines, antitank ditches, partially blown bridges and other relatively short obstacles found in the forward combat areas. The *MTU20*, a class 50 flat-launched bridge on a *T55* tank chassis, has recently replaced the older *MTU* which was mounted on a *T54*. The *MTU20* is longer, (20 meters-versus-12 meters) and lighter per meter than the *MTU*. Like its predecessor, the *MTU20* is less vulnerable during launch than scissors bridges. The span can be retrieved from either side. Three *MTU20s* are organic to each Soviet tank regiment.

First observed by Westerners in 1964, the *TMM* truck mounted scissors bridge has been deployed to both tank and motorized rifle units. It has a greater capacity and length, plus a wider roadway than its predecessor. The *TMM's* two tapered scissors treadways are launched by a girder mounted on the bed of a *KRAZ255B* or *KRAZ214* truck. Each motorized regiment and some tank regiments have one *TMM* bridge set, consisting of four 10.5-meter spans capable of spanning 40 meters. Its maximum capacity of 60 tons enables it to support the movement of tank and missile units across minor obstacles.

Soviet designers developed *PVD20* bridging to support airborne and airmobile units operating in the enemy rear. With an aggregate weight of 13 tons, the *PVD20* is light enough to be transported by plane or helicopter; on the ground it is carried on ten *GAZ63* 4x4 light trucks or six *ZIL151* or *ZIL157* 6x6 trucks. Bridges of either four- or eight-ton capacity, in lengths of either 88 or 64 meters, may be built in 50 minutes using the *PVD20* set.

At this point we must take a look at the US Army's arsenal for the hasty crossing of the same minor obstacles. Organic to the Combat Engineer

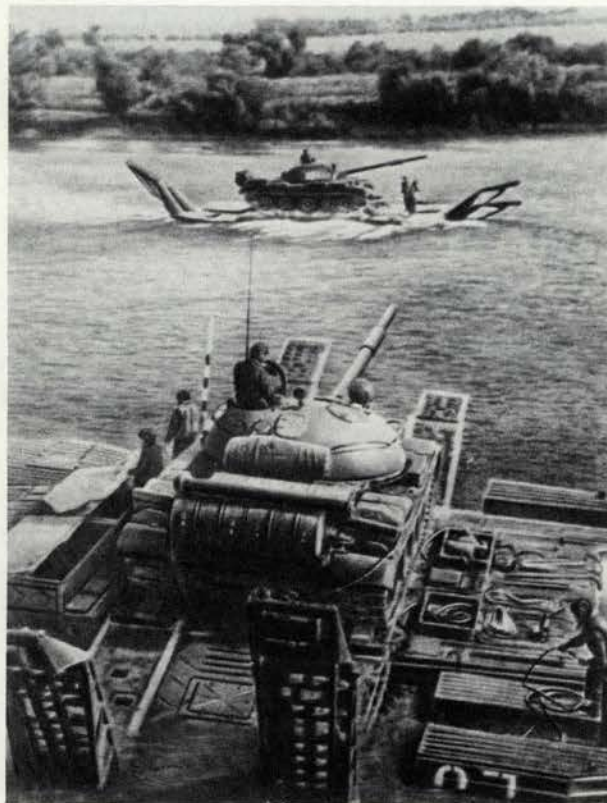
battalions of infantry, armored and mechanized divisions are six AVLB class 60 scissors bridges, mounted on an *M48* or *M60* tank chassis. Two launchers and six bridges are organic to the battalion, while armor battalions also have two AVLBs in their bridge sections. This vehicle enables the engineers to span gaps of up to 18 meters very quickly with a bridge capable of carrying any equipment in the division.

The US equivalent of the *TMM* would be the "dry span," fabricated from parts of the *M4T6* bridge set. This span is basically 11.68 meters long and can be increased by the emplacement of trestle bents available in the engineer battalion's bridge company. The problem of the dry span is its construction time. The dry span is relatively difficult and time-consuming to construct; approximately an hour is needed to construct the first 11.68 meters unless it has been partially constructed in the rear area and transported forward for completion at the site.

Soviet forces have a family of amphibious tractors and a heavy amphibious ferry which are deployed to divisional engineer battalions and higher echelons for the transportation of support, artillery and tactical missiles. The 10-ton *K61* (GPT), an armored full-tracked amphibious tractor, is capable of transporting in excess of five tons of cargo across water obstacles. However, it has largely been replaced by the larger (20-ton) *PTS* tracked amphibian which has *double the capacity* and can be used for seaborne landings as well as under conditions of nuclear or chemical contamination. The *PTS* also has infrared driving and surveillance equipment. Its land payload is five tons. An artillery battalion consisting of a headquarters battery and two batteries of six tubes each could be forded in a single crossing using approximately seven *K61s* or half that number of *PTSs*. Also worthy of note is the Soviet use of the *PKP* amphibious trailer to augment the above men-

tioned amphibians' already considerable transport capabilities.

The Soviets developed the *GSP* heavy tracked ferry to support the movement of heavy tanks, artillery and missile units across major rivers. The *GSP* consists of two mirror-copy tracked, self-propelled units which are capable of ferrying up to 52 tons. Both are equipped with scissors ramps to speed loading or unloading. The *GSP*'s water speed is approximately ten kilometers per hour. The principal disadvantage of *GSP* is that ferries cannot be converted to form a bridge; in addition *GSP* cannot accommodate some over-size vehicles associated with missile units.



T62s rafting on *GSP* bridging

The closest equivalent to the Soviet *GSP* in American units would be the Mobile Assault Bridge (MAB). Using two end sections and two interior bays it is possible to ferry any divisional size load (Class 55) across major river obstacles. The MAB is a relatively new addition to the US Army inventory and provides the Army with a very rapid means of crossing obstacles either with individual ferries or a complete bridge. The MAB is organic to the infantry, armor and mechanized divisions. Its main advantages are its movement into the water without prior preparation, its flexibility in use (either as a bridge or ferry) and self-transportability. Its rapid



Soviet *PMP* bridging

construction capability makes it a very necessary component of river crossing in a nuclear environment. Like all bridges it is vulnerable to enemy air action, and it is very sophisticated, requiring much delicate maintenance.

Perhaps the crowning accomplishment in the Soviet development of river crossing equipment is represented by the revolutionary *PMP* Class 60 folding pontoon ribbon bridging which can be assembled at speeds of almost 20 meters per minute under ideal conditions. While Soviet published norms are approximately seven to eight meters per minute, Western observers have witnessed Soviet engineer units construct 300-foot bridges in as little as five minutes. Such unusually rapid assembly is due to the unique design of the equipment; a six to seven meter pontoon section folded like an accordion is launched and automatically unfolds when the *KRAZ255B* or *KRAZ214* truck on which it is transported is braked at the river's edge. Because of the pontoon's shallow draft, a single man can easily control each pontoon. Sections are normally launched simultaneously along the bank, connected to form a roadway six meters wide, and then swung with the current across the river with the aid of power boats. A system of winch, cables, pulleys, rollers and a boom attachment makes rapid retrieval of pontoon sections possible, thereby providing greater flexibility and the rapid redeployment capability necessary for the fluid nature of modern warfare.

PMP pontoons may also be used to construct ferries with carrying capacities ranging from 40 to 170 tons. The pontoons are rapidly convertible from bridge to ferry or vice versa. Additionally, a 20-ton bridge of considerably greater length can be built if the pontoons are divided lengthwise. The 18 *PMP* sections assigned to a single divisional engineer company are estimated to be capable of spanning

approximately 114 meters in a Class 60 bridge or up to 190 meters of Class 20 bridging. *PMP* support along major axes of advance is provided by one or more engineer assault crossing regiments organic to Soviet combined arms and tank armies, as well as to fronts. It is evident that *PMP* has been deployed in very large numbers to both Soviet and Warsaw Pact armies.

Most US Army corps- and army-level float bridge companies are presently equipped with the *M4T6* floating bridge, consisting of a continuous roadway of aluminum alloy deck-balk supported by 24-ton pneumatic floats. It is an excellent bridge in the water, rather low profiled, easily repaired if damaged and capable of crossing very heavy loads. Its one main disadvantage is the long construction time required for emplacement (three to five hours for 100 meters of bridge).

In July 1973 the Army declared a new standard ribbon bridge to replace the *M4T6* and Class 60 bridging now in the Army inventory. It will allow bridge units to reduce construction times for 100 meters of bridge to approximately 30 minutes. When fully operational in the field, the US Army will have a bridge equal to the Soviet *PMP* in all respects.

Soviet army and front level engineers are also equipped with small and medium highway sectional bridging (*MARM* and *SARM*) for spanning dry gaps or water obstacles in rear areas. The 50-ton sectional arch *MARM* has been observed employed in the interesting function of an overpass across major lines of communication. *SARM* is sometimes used for the hasty repair of partially destroyed bridges and can be erected in one or two lanes. The heavy *NZhM-56* combination road and rail floating bridge is another item unique to the Soviet inventory, and represents a significant asset to insure continued logistical support of front line units despite wide-

spread bridge destruction in rear areas.

This article has by no means exhausted the inventory of Soviet and Warsaw Pact bridging equipment. The Soviets and their allies have several additional types of prefabricated railroad bridging and large stocks of obsolescent, but by no means unserviceable, pontoon bridging (*TMP*, *TPP*) stationed in Eastern Europe. Further, Czechoslovakia, Yugoslavia and Poland have devoted considerable effort to the development of improved bridging means. The Poles, in particular, have engineered the new *PP64*, which can be emplaced even faster than the Soviet *PMP*, although its carrying capacity is reportedly less.

It is evident that the number and types of river crossing equipment presently available to the Soviets and their allies reflects their determination to maintain vigorous rates of advance on either nuclear or non-nuclear battlefields. Their present capability represents a serious threat to any potential enemy, as the Egyptian Army's assault across the Suez Canal despite Israeli air superiority amply demonstrated. Although the Egyptians used *TPP* and *TMP* pontoons as well, the *PMP* bridging supplied by the Soviets proved especially successful due to its rapid construction time and lack of vulnerability to enemy air attack. This was the first extended test of the Soviet bridge under actual combat conditions and it underlined the necessity for the continued allied development of more modern, simple and durable water crossing equipment.

Western armies in general, and the US Army in particular, must continue to place heavy emphasis on the research and development of new and different crossing means. The recent standardization of the new ribbon bridge and the medium girder bridge (*MGB*) are proof of the value of this emphasis. If we fail to continue this program we will fall behind in this crucial aspect of modern ground combat.



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Captain Cecil Green

MOTORCYCLE SCOUTS

What's the enemy's location? What weapons does the enemy have? Where are the enemy's supply routes? What's the best route to avoid the enemy's strong points?

Throughout history, the answers to these questions have often spelled the difference between victory and defeat for many battlefield commanders.

And commanders have often gone to great lengths to gather such information for their campaigns.

Moses sent out a number of scouts to pinpoint the Pharaoh's forces and lead his people to the Promised Land. Rogers' Rangers operated in the American Revolution when regular militia could not get behind the enemy's lines. Both the Union and Confederate forces used hot air balloons to watch the other's activities. Western movies have continually dramatized the role of the Cavalry scout who rode, walked and crawled to find the elusive Indians.

In this century, the use of tanks, trucks, jeeps and other motorized vehicles has enabled the scout to go faster and further than his feet or his horse could take him. More recently, aerial observation with planes, helicopters and surveillance by electronic devices have added new dimensions to the search for the enemy and his movements.

Still for all the sophisticated machinery of modern warfare, there is still an obvious need for someone on the ground to seek and find the enemy as he lurks in caves, ravines, forests and other hidden places on a battleground.

And one major question that always plagues combat commanders is the matter of how a ground scout is to move in search of the enemy in those places.

Of course, the answer to that perpetual problem depends on a number of factors, including the terrain, the weather, the time available, the type of information needed and the combat situation of the moment.

Many new ideas are being examined, and, for several years now, researchers at MASSTER (Modern Army Selected Systems Test, Evaluation and Review) have been studying the role of the modern Army scout and looking at various vehicles that a scout may be able to use on a recon mission.

One part of the MASSTER studies has centered on the use of motorcycles, and, for all practical purposes, Fort Hood, Texas has become the home of the modern Army motorcycles because of MASSTER's studies.

Oldtimers may remember the Army's use of motorcycles in World Wars I and II, but those memories are very much out of date if anyone compares the machines of 30 and more years ago with the motorcycles of today.

Basically, the earlier machines used by the Army were big Harley-Davidson or Indian motorcycles that had a powerful four-cycle, multi-cylinder engine and a lot of weight — well over 600 pounds.

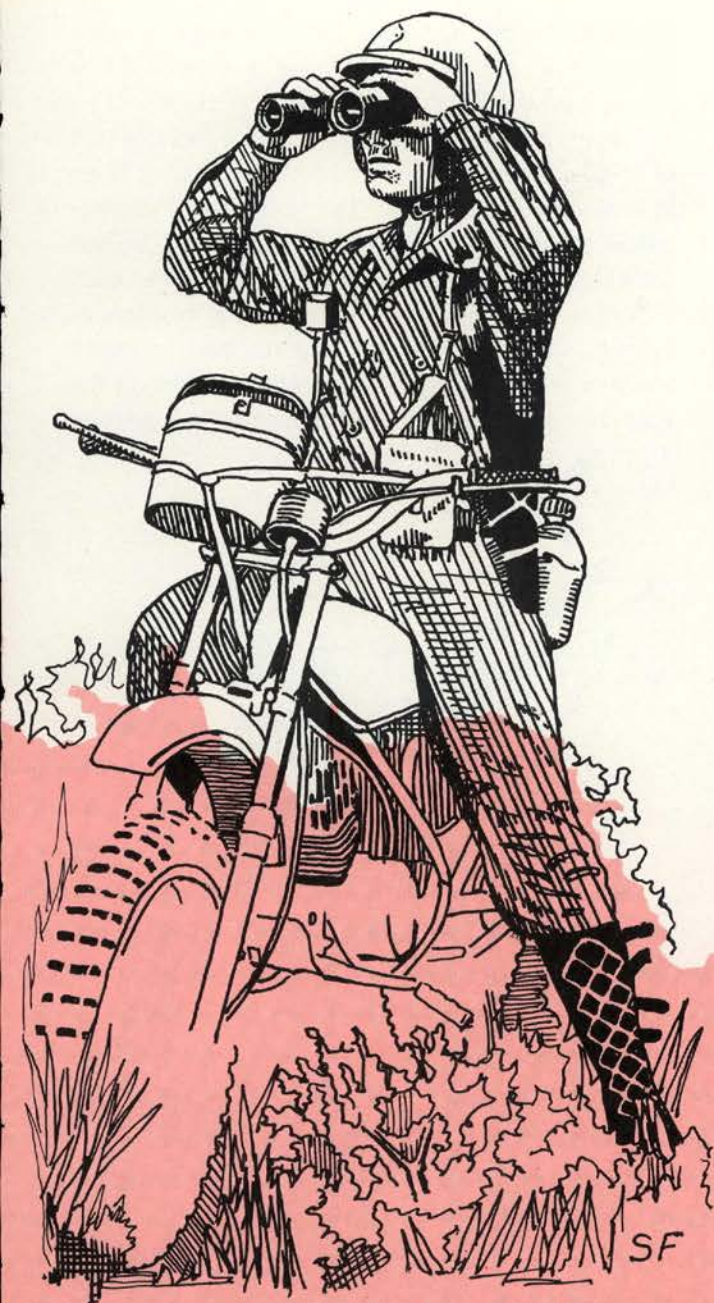
The size of the cycles limited their duty to messenger runs and reconnaissance over hard, smooth roads. If the big machines ever got into rough terrain or soft dirt, they became exceedingly bulky, clumsy and slow; tending not to run at all.

However, since that time, the motorcycle has evolved as a recreation vehicle that is designed to climb over and run through the roughest terrain imaginable, with speed and power to spare. The new machines are much simpler and very lightweight, tipping the scales at slightly over 200 pounds, so they can be manhandled relatively easy.

The Army entered the world of motorcycles in 1972 and purchased about 30 new bikes — many of which are still in operation today. The cycles purchased were manufactured by Suzuki, and were mostly the 185cc model with a few 125cc models included. The cycles are powered by single-cylinder, two-cycle engines, and are designed for both on-and-off road riding. The original red and white coloring of the bikes was quickly replaced by a camouflage pattern and other painting to dull the shiny surfaces.

But the gulf between combat and recreation is often mind-boggling, and transforming a commercial motorbike into a tactical vehicle is a very detailed, thought-provoking project.

The ball began rolling at MASSTER in 1972 with a series of comparative tests, pitting motorcycle-equipped units against the scout elements of



unit, the 1st Squadron, 9th Cavalry of the 1st Cavalry Division is continuing to work with the machines in MASSTER's studies.

During these initial tests, the encompassing question of what to do with a motorcycle and how to do it was explored. To find the answers, MASSTER testers looked at such things as transportation, communication, special equipment, weapons, training requirements, tactics and general abilities of the motorcycle.

Since 1972, much has been learned about the military application of motorcycles, and the learning continues. Every test and exercise that employs a motorcycle provides more information for study and consideration.

Transportation to the area of operations was one of the first lessons learned about the motorcycles. For anyone who has ever ridden a motorcycle, it is quite obvious that riding 20 to 30 kilometers across country to a rendezvous point can be a tiring day's work. Thus the search began for a method to get the cycles closer to the area where the scouts are to do their work.

To date, helicopters, trucks and armored personnel carriers have been used to cart the bikes around, and the helicopters have shown the most promise for combat use with the cycles, especially where long distances are involved.

The method of transport depends on the mission of the motorcycle. If they are to infiltrate an enemy area, a single *UH1* can carry a few scouts with motorcycles in and drop them quickly and quietly. But if an entire platoon of bikes is to be moved, a *CH47* is the quickest way.

With the *UH1*, a number of techniques have been explored to move the 185cc bikes quickly and effectively.

Testers learned that three cycles can be loaded internally in the helicopter in approximately three minutes and they can be unloaded in approximately two minutes.

The bikes were also sling-loaded under a *UH1*, but the method was discarded because of time involved and the threat of damage to the cycles.

armor/mechanized, air cavalry and airmobile platoons.

The Combat Support Company of the 1st Cavalry Division's 2nd Battalion (Airmobile), 7th Cavalry, was selected to receive the experimental motorcycle platoon. For nearly two years they maintained the test mission, provided user recommendations regarding equipment and modifications to the cycle, and trained cyclists for additional test requirements. These cyclists were used almost exclusively in a reconnaissance role, while an additional cycle-mounted antitank unit was created in the division's 7th Squadron, 17th Cavalry, an attack helicopter squadron. At present, both of these units have completed their work with the motorcycle, and only one

Finally, carrier racks were devised to fit over each skid of a UH1, and two cycles were mounted externally on each aircraft. Through the years, this method has become the favored mode of transportation whenever a few cycles have to be inserted into an area quickly.

Additionally, the CH47 can become a cycle transporter, and, again, important lessons were learned during the tests.

When motorcycles were loaded facing the front of the aircraft, 10 were loaded in approximately two minutes. However, it then took about 10 minutes to back the cycles out the exit ramp.

On the other hand, it takes about 10 minutes to load the cycles facing the exit ramp and about two minutes for them to drive out. Thus, the common sense approach to the problem showed that bikes should be loaded facing the rear of a CH47 before a mission, then drive in facing forward when they are airlifted out.

In some of the current exercises involving motorcycles, the two-wheelers have been loaded inside an APC. With the approach, the bikes can be readily available in case a nearby area needs to be scouted quickly with a minimum of force.

And on any mission, communications was also recognized as a factor to contend with.

Again, several approaches were studied with varying degrees of success. Early riders in the tests carried AN/PRC-77 radios strapped either to their backs or to the bike itself. The riders then wore standard aviator helmets with built-in earphones and mikes attached to the radios.

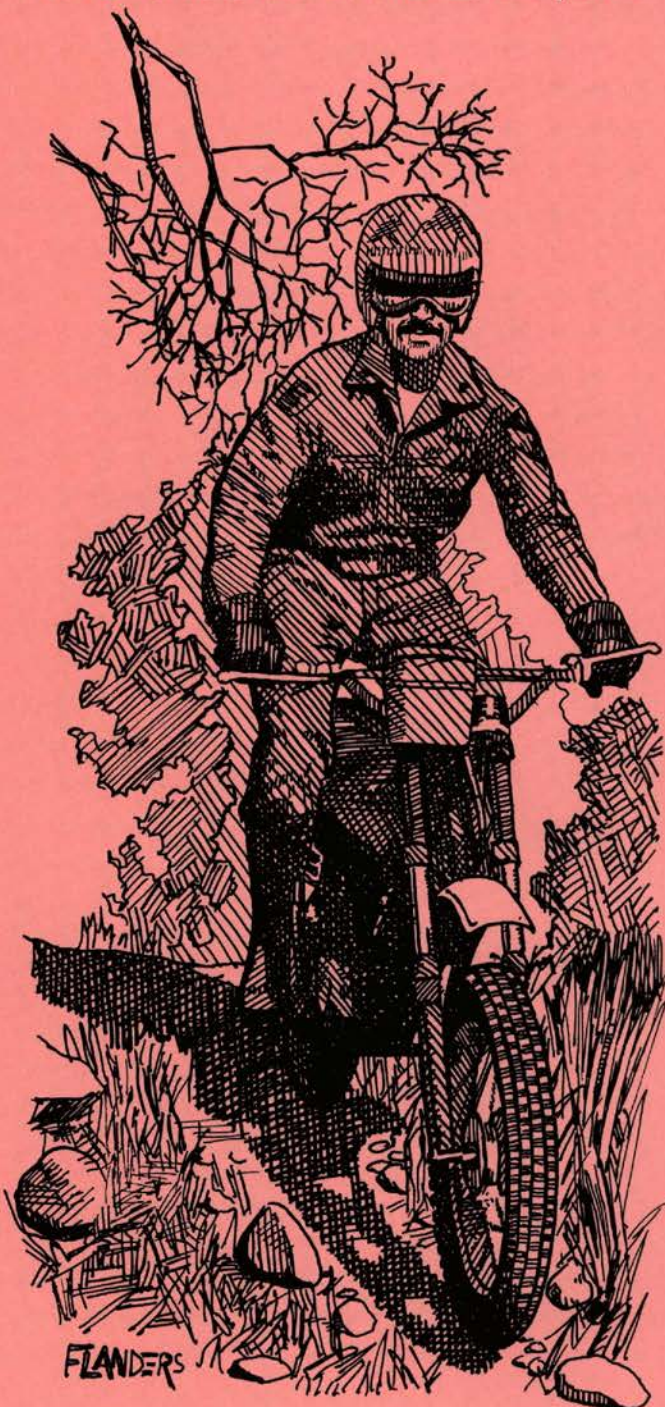
Several problems quickly became apparent. First, the extra weight of the radios on a rider's back tended to throw him off-balance when going over rough terrain. Second, no matter where the radio was, the antenna kept snagging in trees and brush, often breaking off, and, if the antenna was removed, the range of the radios wasn't great enough. And finally, an aviator's helmet just isn't strong enough to stand the impact of a fall.

Now the cyclists at Fort Hood are equipped with small commercial citizen's band "walkie-talkies" that

attach to the belt and have small antennas. A small earphone is put in one ear and a lapel mike is placed near the rider's head.

Communication is difficult, but it is more a lack of special equipment in the inventory than it is an insurmountable problem. The commercial walkie-talkies used now have limited range and limited frequencies, but at least a rider can move with them.

As far as the helmets go, commercial motorcycle helmets have also proved to be the best to insure a rider's safety. MASSTER recently supplied all the Fort Hood riders with new helmets that provide



more protection than an aviator's helmet and are easier to camouflage with a standard cloth camouflage cover.

Other special garb has also been added to a rider's wardrobe to equip him for bouncing through the brush. Most important is the addition of padded, knee-high motorcycle boots that give added protection to the instep, shin and knee.

Most riders also include gloves and goggles in their list of necessities, but the general uniform is still a matter of preference to many.

In the future, special padded motorcycle uniforms may be experimented with, but right now the special suits are only available in bright colors that wouldn't help a scout stay hidden.

The matter of weapons for a scout is still an ongoing study, but several important factors have been learned.

Since the start of the motorcycle tests, a number of weapons have been tried to give the mobile scouts varying degrees of firepower. The weapons have included the *M16* rifle, .38 and .45 caliber pistols, the *M72 LAW* and the *Dragon* antitank weapon.

Anytime a lot of extra weight is strapped on a rider or his cycle, or anything protrudes too far from the machine, problems start occurring. Nothing demonstrates this better than the work with mounting the *Dragon* system on the motorcycles.

Three types of mounts were fabricated to carry the *Dragon*. One mount positioned the *Dragon* in a horizontal position across the rear fender. This method proved unsatisfactory because it increased the overall width of the motorcycle and caused the *Dragon* to hang on trees as the bike went through the wooded areas.

The second *Dragon* rack was mounted on the left side of the rear wheel and positioned the *Dragon* vertically to the cycle. The weight of the weapon shifted the center of gravity to the left and caused the machine to become unbalanced and difficult to control.

The third rack was mounted behind the rear wheel, with the *Dragon* carried vertically. In this

position, the weight of the *Dragon* shifted the center of gravity to the rear of the motorcycle and caused the rider to lose control when the bike was climbing.

Even an *M16* hampers a rider. Whether it is strapped on his back or placed in a scabbard near the front wheel like a saddle gun on a horse in a western movie, it still tends to catch on brush and affect the rider's balance.

Most riders now prefer to ride with just a pistol at their waist or in a shoulder holster, but test officers see a possible need for more firepower. Possible solutions that may be looked at in the future include the *M79* grenade launcher, a short automatic rifle like the *CAR15* or a machine pistol.

The training of motorcycle riders has never been much of a problem at Fort Hood. In about 100 hours of on-the-job training, even novices can become adequate riders and mechanics, capable of taking care of most things that can happen to their cycle.

Also, recruiters have no trouble finding volunteers eager to serve in the distinctive scouting units.

There are still two schools of thought about the type of person who makes the best motorcycle scout.

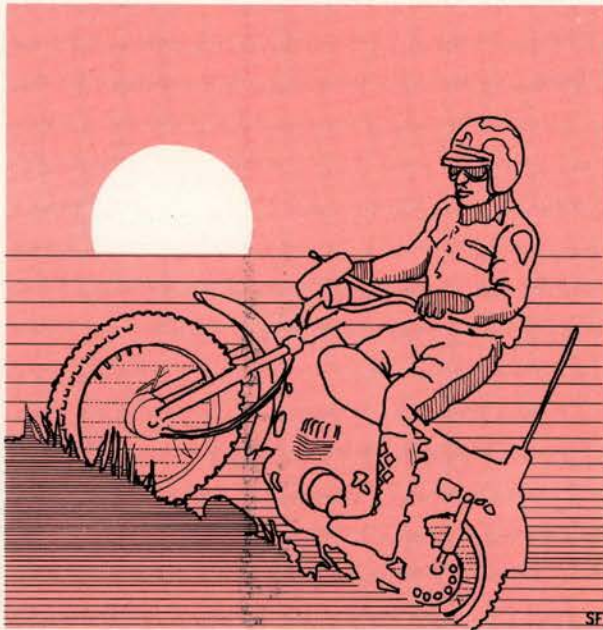
We can either make riders out of soldiers who have been trained as scouts, or make scouts out of soldiers who have riding experience. These two philosophies get back to the basic question of the role of the scout and what his exact job is.

If a scout is simply to move from Point A to Point B and look at Point B, then very little training as a scout is needed. However, if a scout is to quietly infiltrate enemy territory, conduct raid missions, or screen for larger forces, then you may need a trained scout who can understand and use such things as avenues of approach and proper cover and concealment.

This question about the role of the future Army scout is now being studied by other agencies, including the Armor School, and their determinations may greatly affect the role of motorcycles in a ground force. Still, the development of motorcycle tactics continues.

There are no standard tactics now. They are still

We can either make riders out of soldiers who have been trained as scouts, or make scouts out of soldiers who have riding experience. These two philosophies get back to the basic question of the role of the scout and what his exact job is.



being developed by units and individual riders who come up with special ways to accomplish each particular mission.

For example, some units at Fort Hood like to ride in a pack with five cycles fanning out over an area. Others like to use two or three in a group. Also, some don't like to dismount the cycles unless necessary, although one proven scouting method is to dismount, scout ahead on foot using binoculars, then ride to the next terrain feature and repeat the procedure.

On many tactical problems, the motorcycles have proved effective in slipping undetected through enemy lines and conducting raids and scouting missions.

The motorcycles do have a distinctive noise signature that can alert enemy forces, but good silencers, wind or the presence of other motorized vehicles tend to mask their engine noise. In some of the MASSTER tests, the motorcycles have gotten within 50 feet of moving track and wheeled vehicles without being detected, both in day and night operations.

The rapid speed of the cycles across rough terrain also gives them a tactical advantage in some instances. In one test, the machines averaged 16 kilometers per hour in cross-country movements, including frequent stops to visually search the terrain for aggressor elements. When the unit moved from one phase line to another, it moved in excess of 36 kilometers per hour during daylight hours.

During night operations, the cycles averaged eight kilometers per hour in cross-country movement searching for the enemy. The normal operating speed for motorcycles across varying terrain at night

is approximately 20 kilometers per hour.

Naturally, the variation between day and night movement rates was caused by the inability of the riders to see bumps, rocks, small ditches and other terrain irregularities. In other tests, this variance was reduced by providing night vision devices, similar to the AN/PVS-5 night vision goggles, to the riders.

In some tactical situations, the motorcycle's speed can be a definite advantage. For instance, if the cycles are used as part of a stay-behind team or a tank-killer team, soldiers can fire their weapons, then disengage and leave the area on the cycles while the enemy is disorganized. Also, in an airborne or air assault, motorcycles could conceivably be used to move security forces to key points to protect other forces as they land.

Overall, motorcycles have quite a few advantages and disadvantages that tactical planners cannot afford to overlook in the future.

On the positive side, the cycles are fast, cheap, able to cover rough terrain more rapidly than most other vehicles, difficult to spot on radar, simple to maintain and operate and have low POL consumption.

However, on the negative side, they have a distinctive audio signature for identification, are easy to ambush because a rider's vision is usually concentrated on the ground in front of him while he is moving, are limited in firepower, are limited in the amount of equipment they can carry and are hampered by some terrain features, such as steep ravines and deep water.

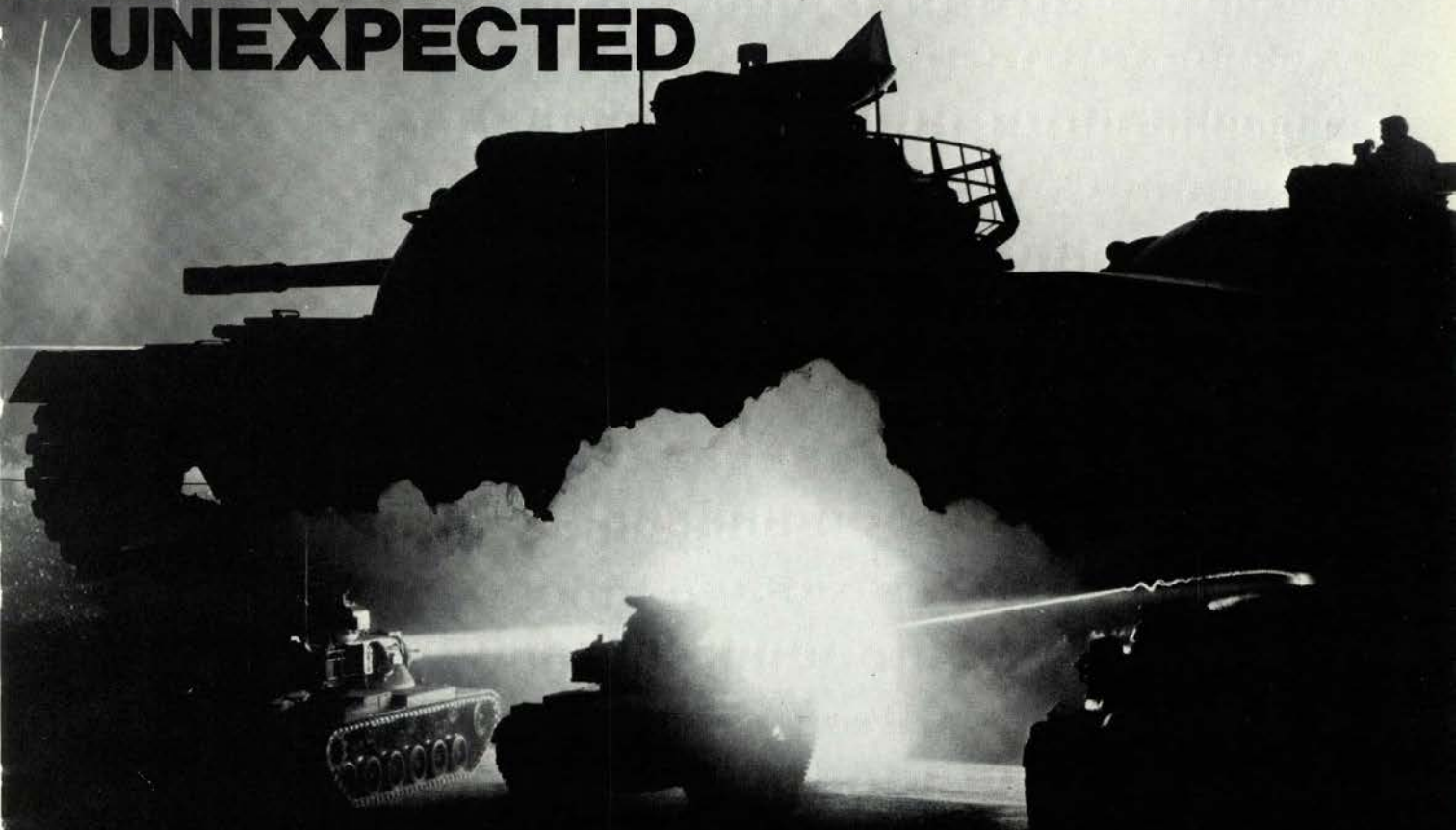
Still, the use of motorcycle scouts is an interesting concept — if not a romantic one — because it closely approximates the use of the scout of 100 years ago, only modified by the application of modern technology.



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CAPTAIN ROBERT A. DOUGHTY

THE NIGHT ATTACK AND THE UNEXPECTED



THERE IS NO TRUER INDICATION of a tank unit's professionalism, elan, and combat effectiveness than its ability to conduct a successful night attack. The reason for this is simple; the night attack is the most difficult operation for an armored unit. Most commanders are well aware that if anything can possibly go wrong, it will go wrong in a night attack.

Night attacks, however, add an important and essential dimension to the capabilities of armor. They may be used to continue a daylight attack, to seize terrain for further operations or to cross terrain at night that is impractical to cross during the day. The night attack strives to employ surprise by the sudden application of firepower to destroy enemy resistance and to gain shock effect by the unexpected appearance of armored vehicles to destroy the enemy's will to fight. The effect of the sudden appearance out of the dark of an attacking armored unit with weapons blazing can have a devastating effect on even the best-trained enemy units. The commander who does not utilize night attacks or who misunderstands the potential of night armored attacks may be neglecting one of his greatest opportunities.

Because of the difficulty and complexity of a night attack, the commander must meticulously plan every detail of such an operation, but at the same time must maintain maximum flexibility in his methods of command and control to deal with any unexpected dangers and developments. An inability to respond to an unanticipated situation could lead to a failure to accomplish an assigned mission, or the commander's loss of control over his unit — the greatest danger in a night attack. Control is always the key. The commander will be able to maintain control only through a detailed plan that allows for every possible mishap but still retains enough flexibility to respond

to the unexpected.

There are numerous historical examples demonstrating the importance of careful preparation for armored night attacks. A good example of a night attack that succeeded only because of meticulous planning and extraordinary control measures occurred in France on 7-8 August 1944. The 144th Regiment of the British Royal Armored Corps, as part of the 33d Armored Brigade, was to conduct a night attack with elements of the 7th Infantry, 51st Highland Division with their objective being the town of Cramenil. In order to reach this objective, these units had to pass through approximately three miles of enemy territory.

To maintain tight control over the column, the British units formed into a tight phalanx of armored vehicles, including tanks and personnel carriers. The front of this compact mass was four vehicles wide with approximately two yards between each vehicle. The entire column was about 16 yards wide by 350 yards long. But things still went awry!

An air bombardment was supposed to disorganize the enemy's forward defenses, but unfortunately some of the British armored vehicles drove into the resulting ten-foot deep bomb craters. A dense dust cloud was also created by the air attack and, when this mixed with the thick night fog, it was practically impossible for the following vehicles to maintain visual contact with the vehicles ahead of them. The situation became further confused when contact was made with the enemy. Subordinate units became intermingled, and radio transmissions became almost useless because no one knew if the tanks around him were actually the ones with whom he was talking.

Nevertheless, the attack did succeed in capturing its objective, primarily due to the aggressive leadership of the small-unit commanders and the great confusion and shock that was created in the enemy lines. A remarkable amount of territory had been gained, and an important objective seized. Without the intense planning and extraordinary control measure of the tight phalanx of armored vehicles, however, there is little doubt the attack would have stalled in confusion with the initial enemy contact.

Control measures may also be used to insure that the unit does not become disoriented, and there are many different techniques that could be useful to the commander. Some possibilities are: using flares or illuminating rounds to mark the objective; firing white phosphorus behind the objective area to guide the maneuver unit; firing tracers over the heads of

the attacking force in the direction of the objective; marking impassable areas with tracers, white phosphorus, artillery concentrations, dismounted guides, etc.; or using ground surveillance radar to vector the maneuver element. Some of these obviously have their limitations. For example, when a unit is engaged, it would be difficult to determine which tracers were being fired at positions being marked, and which were being fired at the enemy. Also, if the wind were blowing toward the attacking force, smoke from white phosphorus rounds could diffuse some of the illumination or make visibility even more difficult.

An example of how *not* to do it occurred in the Korean War on 18-24 August 1950 in an area north of Taegu which later became known as the "Bowl-ing Alley." The US 27th Infantry Regiment, 25th Infantry Division, received a series of seven night attacks from the 13th North Korean Division in which the North Koreans habitually used green flares to mark the location of the objective area. The resourceful men of the 27th Infantry Regiment quickly noticed this and obtained their own green flares. From then on, when the enemy began its attack, the 27th would fire its green flares over its main defensive positions. This caused confusion among the North Koreans, and on several occasions caused them to assault the wrong area, resulting in heavy casualties on their side. From this, one can conclude that when the commander plans on the use of pyrotechnics, radar, or other means to guide his attack, he must plan a secondary method in case the enemy is able to compromise the effectiveness of the first method.

Another area of particular importance is coordination between adjacent, supporting and attached units. This becomes particularly important in the night environment when it is so difficult to tell whether a vehicle or person is enemy or friendly. After dark, terrain features seem to change, obvious landmarks no longer seem obvious, and guide points that might be easy to find on a map suddenly become difficult to locate. Consequently, it is very easy to become lost or disoriented. Recognition signals must be established, and this is even more important if another unit is operating nearby. Examples are colored or filtered flashlights on vehicles, white arm bands on leaders or on the entire force, luminous marks or tapes, or even sound devices.

An example of an unfortunate lack of coordination occurred with the US 117th Infantry Regiment,

30th Infantry Division, on 26-27 February 1945. A platoon of British flail tanks was attached to the 1st Battalion, 117th Regiment, for the clearance of mines in a night attack. While conducting the night movement, the platoon became disoriented and separated from the column of the 1st Battalion. Upon realizing its mistake, it retraced its path and came into the 3d Battalion's area. This unit mistook the flail tanks for enemy vehicles and destroyed the entire platoon. Had detailed coordination been effected, this tragic error could possibly have been avoided.

A similar problem could occur with the infantry accompanying the armored night attack. For ex-

Ridge, North Africa, in the Battle of Alamein on 1-2 November 1942. The brigade was to attack at 0545 hours to overrun the defenses established by the Germans along the ridge, but unexpected enemy resistance encountered by one of the armored regiments in its movement to its attack position forced a 30-minute postponement of the attack. The subsequent night assault failed to overrun the antitank positions established by the Germans before daylight. When dawn came, the brigade found itself in the killing zone of the enemy antitank weapons, and 75 of the 94 attacking British tanks were destroyed. Had the unit been somewhere other than in the killing zone when daylight came, the results would



ample, on 20-21 March 1969, in Quang Ngai Province, South Vietnam, the ARVN 1st Troop, 4th Armored Cavalry Regiment was attempting a night attack through a heavily wooded area. Unfortunately, the attacking force overlooked several North Vietnamese soldiers dressed as ARVN infantry. After being overrun, these enemy soldiers infiltrated the ARVN infantry, and assumed positions among them. The enemy then began firing from within their ranks and, needless to say, chaos resulted. The Vietnamese commander was finally forced to pull back from the attack and have the company commander and platoon leaders of the attached infantry company visually identify every man in their unit. A well-planned attack had collapsed because of the unexpected.

Another important control measure seldom left to the discretion of the company commander, or even of the battalion commander, is the time of the attack. Still, it is important for every commander to carefully consider the proper time for a night attack if the decision is left to him. An example of a unit not being allowed enough time for seizing an objective occurred during World War II in the attack of the British 9th Armored Brigade on the Aqqaqir

possibly have been completely different. The unexpected had led to the near annihilation of this brigade.

It is crucially important that enough time be allowed for the unit conducting the night attack to complete its mission. The attack is begun early in the evening if the objective is deep, if the commander expects to exploit the attack at night, or if he expects to hold the objective and must consolidate and reorganize before daylight. The attack would begin late at night if the objective is to be an initial one with additional attacks or exploitation commencing at daybreak.

The selection of a unit's objective is also an important control requirement. Current armored doctrine stipulates that a night tank attack should be "limited." Yet, while "limited" may mean 1,000 meters in one situation, it might mean something completely different in another. The actual limit is one obviously imposed by requirements for control. If the area of operations is ideal terrain, or if, on the other hand, it requires a change of direction, has numerous obstacles, or has several wooded areas, the depth of a "limited" objective would be quite different.

A "limited" night attack might also follow a long approach march, or even an infiltration through a wide gap in enemy lines, as the Russians did quite frequently to the Germans during the latter part of World War II. A "limited" attack could also be followed by a night exploitation. Field Marshal Erwin Rommel, who was then commander of the German 7th Panzer Division, did almost exactly this when his unit attacked the westward extension of the Maginot Line in France on 16-17 May 1940, during the early days of World War II. His penetration of the French defenses and subsequent night exploitation covered nearly 50 miles. If he had held his unit to a "limited" objective, certainly the results he achieved would have been far different. The "limit" thus is imposed by control requirements, rather than kilometer distance.

Nevertheless, the best control measures will not by themselves make a unit succeed in a night attack if every facet of its attack has not been carefully planned and prepared. For example, the commander must carefully consider and be well aware of the type of terrain his unit will be traversing. The best method to study this terrain is, of course, through the conduct of a visual reconnaissance. If this is not possible, and it frequently is not, then an exceedingly cautious and detailed map or aerial photograph reconnaissance is necessary. One instance when this was not properly accomplished occurred with the Japanese 2d Division during the battle of Guadalcanal. During the period 13-23 October 1942, this division attempted to conduct a flanking movement from Kakumbona to the right bank of the Lunga River. After circling around the main body of the American forces, its mission was to conduct a series of night attacks to seize Henderson Field near Lunga Point.

The basic problem for the attacking Japanese force was that their maps were inaccurate and the available aerial photographs were incomplete. Based on the few aerial photographs that it had, the 2d Division concluded that the more than 18 miles of mountainous terrain along the projected route between it and its objective were not densely wooded and could be crossed without a great deal of difficulty. It expected to be able to move the entire division around the main American forces between 13 and 20 October. The attack would be launched on the night of 20 October.

However, numerous difficulties were encountered. Conditions in the jungle, the difficulty of the terrain, and an unexpected amount of rainfall caused

serious delays and several changes in the date of the attack. Furthermore, the poor roads and rugged terrain, the lack of horses or other transportation means, made the movement of heavy equipment almost impossible. The 2d Division was forced to abandon most of its artillery and other heavy weapons as it moved forward. The move was also a severe drain on the men, and their condition was worsened when most of the field rations had to be left behind.

The first night attack was finally made on 23 October, and amazingly enough, surprise was achieved. Since it initially encountered only one American Marine battalion, the 2d Division might have succeeded in its mission. However, the arduous strain of the movement through the difficult jungle terrain had seriously sapped the fighting ability of the Japanese division. It had exhausted the men and forced the abandonment of much essential equipment. Had the Japanese been better aware of the terrain they faced, they might have avoided the bitter defeat the Americans inflicted upon them.

From these several examples, it is apparent that the success of the night attack depends on meticulous planning, detailed preparation, simplicity of method, and achievement of surprise. And the commander must always remain flexible and prepared to handle any unexpected eventualities—whether in unforeseen enemy weaknesses or unanticipated problems or dangers. Still, even with the best of planning, a devastating failure can result if the unit has not been properly trained to operate at night. Commanders must anticipate the possibility of night operations and must prepare their units. Only when a unit has operated so much at night that it considers the night as concealment for itself rather than for the enemy can we say that the unit is prepared for the night attack.



CAPTAIN ROBERT A. DOUGHTY received his commission from the US Military Academy in 1965 and served with the 4th Armored Division in Germany as a platoon leader, company commander and battalion operations officer. He served in Vietnam from 1968-1969 as an advisor to a Vietnamese armored cavalry troop in I Corps. Captain Doughty is currently assigned as an instructor of history at the Military Academy.

COMMAND AND CONTROL

-Demands of the Battlefield

by Captain Lyman Harrold

In combat the commander must position himself at the point from which he can best control his unit. The tank commander must decide how he is going to place himself into that position depending on such factors as communications, command post, security, weather and terrain. He must be able to keep pace with his company as it moves across the battlefield. He must be capable of responding immediately to the tactical situation and the directions of higher headquarters. He must be protected from the hostile environment of the battlefield. He must have readily available the equipment and personnel essential to properly command and control his company.

The commander places himself in the best position to command and control with his command vehicle. This vehicle must possess the capabilities mentioned above. The Table of Organization and Equipment (TOE) of the tank company, TOE 17-37H, allocates a quarter-ton truck and a main battle tank to the commander. The quarter-ton truck offers no protection from artillery fire or enemy small arms fire. Therefore, the most suitable command vehicle seems to be the tank, or is it? When a company commander uses his tank as his command vehicle he assumes all of the duties and responsibilities of the tank commander. Actually, by using the tank as the command vehicle the commander restricts his ability to command and control his unit. This fact becomes even more apparent as tanks become more sophisticated (such as the *M60A2*), requiring more concentration on the part of the tank commander. The command and control of a tank company in combat requires 100 per cent of the commander's time and concentration.

Further restrictions are imposed upon the commander by adherence to the allocations of the TOE. A tank has been provided for use by the Artillery Forward Observer (FO). Few FOs are qualified as tank commanders and his tank becomes a battlefield

taxi. Additionally, separating the FO from the commander wastes precious time in obtaining artillery fire. Artillery is going to be increasingly more important to the tank commander on the battlefields of the future.

Consider the following situation: Company A has the mission to seize Objective Blue, consolidate for defense, but be prepared to continue the attack on order.

The company advances along a covered avenue of approach toward the attack position. As it passes through the attack position the platoons deploy and continue to move across the line of departure, the first platoon left and the second platoon right, with the third platoon covering the company's right flank. The company commander positions his tank to the rear of the first and second platoons in the center sector. The FO maneuvers to a position near the company commander. Suddenly, the second platoon begins to receive effective antitank fire from prepared positions approximately 2,000 to 2,500 meters to its front. Two tanks are destroyed and one is severely damaged. The platoons immediately seek and occupy defilade positions and engage the enemy with their main guns.

The attack has come to a halt.

The company commander maneuvers his tank into a defilade position from which he can observe the platoons and the FO does the same.

The commander wants the third platoon to maneuver into a position from which it can assault the enemy on its flank. He must instruct the first and second platoons to place suppressive fire on the enemy to cover the advance of the third platoon. He wants artillery fire shifted to the enemy positions and he must inform the battalion commander that his attack has come to a halt. The company must destroy the enemy antitank guns and continue on to the objective and to do so it must have all the firepower it can muster.

Examine the situation closely. The commander must give his orders to the platoon leaders to implement his plans. He must contact the FO to obtain the fire he needs, and he must contact the battalion commander and inform him of the situation. He is very much aware of his company's need of firepower and must decide if he should employ the guns of his and those of the FO's tank. To do so he must sacrifice some degree of control of the company in order to add the firepower of his tank to that of the company. And how effective will the FO's tank be if employed to provide fire?

Is there a better way? Yes, and the means are to be found within the organic assets of the company. By tailoring the company, the commander can avert the situation described and control his company more effectively. How? The first requirement is to find the best command vehicle available. It must provide armored protection, all-terrain mobility, organic firepower for self-protection, effective communication and adequate working space for command functions. The *M113A1* Armored Personnel Carrier (APC) allocated to the company maintenance section fills the bill. The maintenance section will still possess armored protection and firepower with the *M88* Recovery Vehicle and any overflow of personnel resultant from the loss of the APC can be transported by the section's organic two-and-a-half-ton cargo truck.

The second requirement is the communications system. The APC is provided with an *AN/VRC-64* radio set, but it alone is not adequate. Supplement that radio set with the receiver transmitter (*RT-534*) from the commander's quarter-ton truck which mounts the *AN/VRC-47* radio set. The APC will accept both radios with only minor adjustments required.

The third requirement is to have access to those personnel essential to command and control the company. The FO is obviously essential and a radio telephone operator (RTO) would be very beneficial. The company commo chief would easily fill this need. In addition, if available, an FO from the battalion mortar platoon would be included. Additional personnel required would be determined by the commander and the situation. The APC can easily transport all of the personnel mentioned.

Consider the end result of the tailoring just completed. The commander now has a command vehicle with simultaneous two-way radio capability, augmented by the *AN/PRC-77* radio set of the FO, and the personnel essential for command and control are now at arms reach. Additionally, the two tanks previously used by the company commander and the FO are now available to supplement the company's combat capability. The commander can use them to reinforce a platoon, as security for himself, or any number of missions made necessary by the tactical situation.

After tailoring for improved command and control capability, reconsider the situation previously described.

The commander now has an additional light tank section to utilize; for example, he could reinforce the

second platoon which was most heavily engaged. Regardless of the mission assigned, the commander is able to utilize all of the company's organic firepower without lessening the degree of control he has over it. He can obtain artillery fire simply by showing his FO where he wants them by use of a map or pointing the area out on the terrain.

While the commander controls his platoons on the company radio net his RTO can simultaneously keep the battalion commander informed of the situation using the other radio on the battalion radio net. At no time is either radio net off the air due to changing frequencies as occurs when a single radio set is used.

The commander saves valuable time, maintains complete command and control of the company and adds additional firepower to that of the platoons by effective tailoring of the assets made available by the TOE.

The method of tailoring described has been tried and proven effective by the author. It is not the ultimate nor only solution to the command and control challenge. Each commander must decide for himself if tailoring his unit's assets is required or essential to meet the demands of any situation or requirement. He should not feel compelled to restrict himself to the allocations made by the TOE. Any modification made to a structure which improves functioning or capability is correct and justified.

That the commander is responsible for everything his unit does or fails to do is a fact which cannot be denied. He must be able to function at 100 per cent capability at all times, under all conditions, and he cannot permit anything to prevent him from doing just that. He owes that to himself and the men under his command.



CPT LYMAN L. HARROLD was commissioned in Armor through the ROTC program at Arizona State University in 1969. He has served as a motor officer in Germany, Vietnam and CONUS. Captain Harrold served as an M60A2 company commander at Fort Hood, Texas prior to his current attendance at the Armor Officer Advanced Course.

Pages from the Past

First Armored Tanker Insignia

First Armored Division soldiers at Fort Hood, Texas, who successfully complete the Individual Tank Combat Course are sporting a new "Tanker" insignia on their uniforms. The insignia, a green diamond-shaped piece of cloth with "TANKER" spelled across the middle, will be worn over the right shirt pocket.

Major General Bruce C. Clarke, USA, Commander of the First Armored Division, secured authorization for the patch in recognition of tank proficiency. To qualify as a "Tanker", a crew must have a good maintenance record and achieve a rating of excellence on the complex range designed by the division commander. The tank course includes exercises in fire orders, loading, firing, range estimation, tracking, radio and combat driving.

ARMOR

November-December, 1951

Grant's Idea of the Pistol

APROPOS of the revival of the Saber and Revolver question, it may be well to recall General Grant's opinion on the subject.

I find in the Army and Navy Journal of March 31, 1888, an account of a meeting of General Grant with Kaiser Wilhelm. The General tells the story and says: "I spoke of two changes I would make if I organized another army, namely, the abolishment of the saber and bayonet. My argument was that for fighting power a pistol would surpass either while the weight of the saber and bayonet be given to ammunition and rations."

The Cavalry Journal
March, 1911

The Aviator

The aviator has come to the aid, not to replace the cavalry. Close reconnaissance is left to the cavalry whose vision is not dimmed by clouded skies. In combination with airplanes, squadrons of cavalry find new employment.

The motorization of armies is one of the most important questions of military development. It may be briefly pointed out that for the time being, roads, bridges, forests and mountains still oppose mass employment of motor vehicles. — General von Seeckt, late Commander-in-Chief German Army.

The Cavalry Journal
May-June, 1938

Machines, Maneuvers and Mud

Recent operations in Spain have demonstrated again that it is men, and not machines, that fight wars. Our national defense planners should heed the comments of Major General Hugh A. Drum on the recent maneuvers at Fort Knox, as printed in the *Illinois Guardsman*. General Drum says:

"The proposal that motors replace all animals is an extreme view not warranted by experiences in China and Spain and certainly not in the terrain surrounding this CPX (command post exercise)."

The exercise was carried out during a very rainy season, and unofficial reports are that the mechanized cavalry, tanks and truck trains encountered considerable difficulty except on paved roads. Many skeptics returned convinced of the importance of real cavalry in any modern scheme of war.

The Cavalry Journal
January-February, 1939



AT THE BEGINNING of the Korean War, the US Army began collecting data for a study of captured American soldiers. This study was begun in late summer of 1950 and completed on 29 July 1955, several years after the armistice signing at Panmunjon. Drawing from its study results, the Army felt that the PW rules should authorize the prisoner to give only his name, rank, service number and date of birth. This particular provision is in concert with the Geneva Convention of 1949 to which most of the Free World and Communist states are signatories. The Army's position precipitated an interservice controversy resulting in the matter being submitted for arbitration to the Secretary of Defense. The secretary, Charles E. Wilson, set up an advisory committee of five civilians and five retired admirals and generals. The requirement for retirees was directed in the hope that their judgment would be unaffected by service loyalties. The Advisory Committee on Prisoners of War sent their recommendations to President Eisenhower who then issued Executive Order 1063, establishing the Code of Conduct in August 1955. However, the debate and controversy remain as intense today as when the Code was implemented.

The establishment of the Code was unprecedented in American history and the need for drafting it became readily apparent: "That some of the prisoners were behaving strangely became evident surprisingly early in the hostilities — to be precise, at 1155 hours (Greenwich), 9 July 1950; only four days after our ground forces had first engaged the enemy in Korea. At that time an American Army officer of the 24th Infantry Division, taken prisoner some 48 hours before, made a 900-word broadcast in the enemy's behalf over the Seoul radio. Purportedly speaking for all American soldiers, this man said, among other things, 'We did not know at all the cause of the war and the real state of affairs, and we were compelled to fight against the people of Korea.

It was really most generous of the Democratic People's Republic to forgive us and give kind consideration for our health, for food, clothing and habitation'."

While in captivity in Korea, some American PWs wrote letters home urging public protest of the war or wrote articles critical of our government and big business, "the imperialists." The fact that there were few escapes or even organizations within the camps to plan escape would to some people be proof of the PW's duplicity. In a recent article in *ARMY Magazine*, Captain E. J. Marohn wrote, "In one camp, in fact, there were only six armed guards for 600 Americans and there was not one escape attempted."

Was our lack of successful escapes in Korea an

indication of our fighting man's lack of initiative, bravery or patriotism? This conclusion cannot be supported by comparing the Korean conflict with our World War II experience. The Korean War placed our PWs in an alien culture whose central political dogma was communism. Our physical stature, customs and language made it considerably more difficult to avoid recapture. The climate and terrain were another hindrance which made escape

Is the Code of Conduct Viable?

Captain David J. Matthews III

especially hazardous. Additionally, there were no contiguous neutral countries to which escape would be advantageous, e.g., Spain and Switzerland. The aforementioned reasons are similar to those that the PWs found during their Vietnam internment. However, the great bulk of Korean PWs were lower ranking enlisted men while in Vietnam only 132 of the 650 captives were enlisted men.

"Everybody says we had nothing to do, but we did have something to do, we had an obligation to fulfill," Air Force Lieutenant Colonel Alan Lurie said recently. He continued: "That was to follow the Code of Conduct to resist the North Vietnamese attempts to exploit us. And that was a full-time job in that situation." Although the political debate over our military involvement in the Indochina War has

dissipated, the validity of the Code of Conduct is yet to be decided. The Secretaries of the Navy and Army have both declined to pursue disciplinary action against alleged UCMJ violators. The rationale for their action was that the men involved and their families had suffered enough and that any PW's duplicity was achieved through torture. But, was there an underlying reason, a fear of political ramifications?

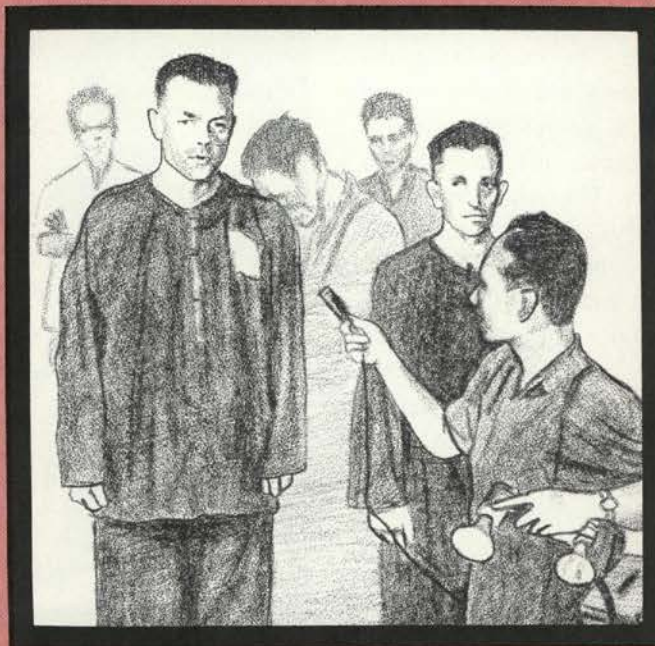
It is essential to review the brutality inflicted on our recent captives before evaluating the effectiveness of the Code. The accounts related thus far suggest a continuation of the pattern of exploitation of prisoners that was our unfortunate experience during the Korean War. This was accomplished through sensory deprivation and physical punishment to mold the PW to the

captor's usage. Exemplary of this was the following account:

"Shortly after his capture in 1967, Air Force Lieutenant Colonel Dramesi said he was bolted by the ankles to concrete blocks in his cell for two weeks without ever being moved, 'living in my own filth.' For a time his right wrist was chained to his left ankle. It was only when Dramesi's feet were swollen 'like an elephant's,' that his interrogator, a man nicknamed 'The Bug,' offered to release him from the stocks if he agreed to write about past missions."

South Vietnamese captives also relate similar tales of systematic brutality, scarce food and medical neglect. The Viet Cong and North Vietnamese for their part deny the maltreatment charges and state that such allegations were part of "a campaign staged by the other side to cover up brutal acts against our personnel."

The Geneva Convention of 1949, to which the North Vietnamese are signatories, states in part: "No physical or mental torture, nor any other form of coercion, may be inflicted on prisoners of war to secure from them information of any kind whatever." I believe that the shame of torture ultimately rests upon those who inflicted it and not the victims.



The wonder is that there wasn't a stampede of collaborators in hopes of obtaining better treatment.

The professional soldier's efforts to understand what went wrong with the Code of Conduct in Vietnam is complicated by contemporary society and government. These complications further inhibit restructuring or revitalization of the Code itself. The following quote was typical of the malevolence expressed by an exceptionally vocal segment of our populace: "Their (the PWs) accounts of the horrors of long incarceration are understandably moving and fascinating. Our society's solicitude for their readjustment and well-being is commendable. Yet, there are many times more persons imprisoned here at home for whom no one but a few do-gooders and reformers give a thought. Of course, those at

home were put away for crimes they committed. But weren't the prisoners of war jailed because they were over there for killing people?" The result is that the soldier is required to defend his actions as though he were a war criminal. Sergeant Edward Drabic was a prisoner-of-war for 1,635 days, or 39,240 hours. When the time came for him to return to the United States he said, "I was dreading returning to the States because I didn't think

the people wanted us and I didn't know what to expect." He related that his fears were heightened when he and his fellow PWs were shown films of the antiwar demonstrations and given copies of American literature that was flattering to the antiwar movement. Throughout our involvement in Vietnam the prisoners of war played a leading role in the bitter national debate.

Dr. Robert J. Lifton, a professor of psychiatry at Yale and an expert on the problems of veterans, said: "I'm pleased like everyone else that the prisoners are getting home. But what's disturbing is the image being created of simple, old-fashioned American military virtue, as though nothing had happened in Vietnam, and as though the understandable emotion around these men can wipe away 10 years of an

ugly, unjust war." Some of our politicians and scholars forget that the soldier is an inextricable part of the civilian population from which he comes and that he does not make national decisions on strategy and weaponry. These circumstances led to the enemy using his most debilitating weapons against our PWs, the American public's attitude about the war.

Equally perplexing to the serviceman was the vacillating position taken by the Department of Defense on the individual's requirement to adhere to the Code. Toward the end of the term of President Johnson, a proposal was made to give American PWs blanket permission to make any propaganda statement that they desired. The United States government would announce this through all media services.

Unlike the post-Korean War period, the Code conflict this time involved differing opinion between the Navy and the Air Force. The major argument in favor of this public amnesty was that it would deprive the captor power of a psychological advantage and concomitantly negate any propaganda value of recorded statements. The Air Force, who had an overwhelming majority of the personnel as PWs generally accepted this proposal. However, the Navy opposed the exemption stating that "absolving men of their strict duty under the military code would undermine discipline in all services." This ambivalence ultimately extended into the camps themselves. PWs who were captives prior to 1968 were fiercely opposed to the slightest hint of accepting favorable treatment, e.g., an extra five minutes in the exercise yard. Those captive after 1968 were more likely to give vocal support to the aggressor. The political and social discontent which these post-1968 captives reflected was a significant factor in the individual interpretation of the Code.

In the Vietnam conflict there were a relatively small number of ex-PWs charged with collaboration crimes and these charges were dismissed. An ex-PW and member of "The Peace Committee" stated that his feelings of revulsion against the war were fostered by being detained with other PWs similarly opposed. "That's when we actually began making statements. Generally, what we did was to write the statements and make recordings of them." He said that this was done voluntarily and out of conviction and that the approach was educational and not a plea for rebellion, mutiny or desertion.

What role does this pressure of conscience play in the act or alleged act of collaboration? How many actually collaborated in hopes of favored treatment

or out of conviction? In an interview with the New York Times, 1 April 1973, one of two senior officers accused of collaborating said in response to a question pertaining to prisoner attitude, "It was varied. Some said, 'I'm with you, but don't include me.' Some were of course, disgusted, but there was no problem. Everybody recognized a person's personal opinion." These issues raise the question of whether voluntary collaboration or that made under duress is punishable. Under our justice system, no statement obtained under duress can be used as evidence against a man. What about our constitutional right to freedom of speech? Should the soldier be made to adhere to the name-rank-serial number concept until torture forces him to do otherwise?

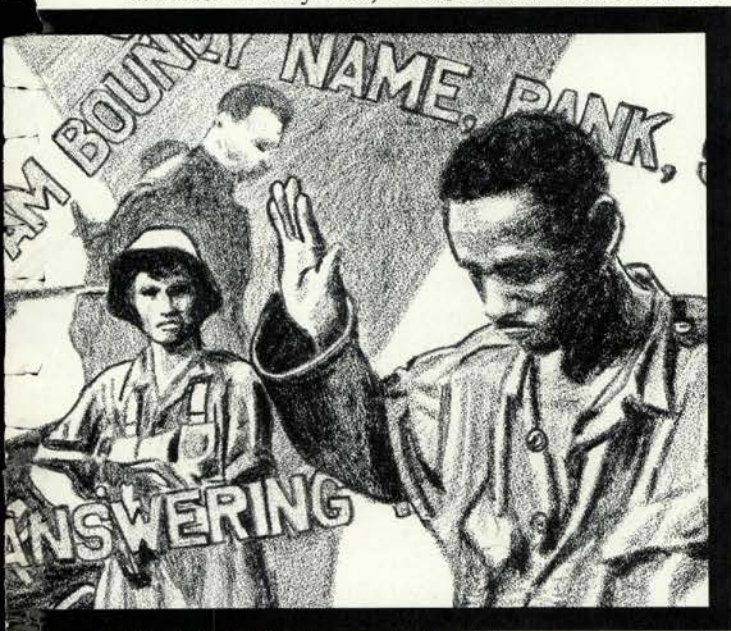
Article V of the Code states: "When questioned, should I become a prisoner of war, I am bound to



give only name, rank, service number and date of birth. I will evade answering further questions to the utmost of my ability. I will make no oral or written statements disloyal to my country and its allies or harmful to their cause." S. L. A. Marshall, the distinguished military historian, wrote: "Here, I need explain that I was chairman of the three-man subcommittee that drafted the Code of July 5, 1955. The military code of conduct was written and promulgated, not with the hope that it would stop derelictions and reform scoundrels, but would direct American fighters, when taken prisoner, to stand together for the common good."

Our servicemen have not always adhered to the language of the Code since its implementation. The crew of the USS Pueblo were the first members of the armed services not captive in Vietnam to test

the efficacy of the Code. The dictates of the Code were not followed by all crewmen. The United States government struck a serious blow to the Code when it was a signatory to a false statement regarding intrusion into North Korean territorial waters. Our government's capitulation surely posed serious doubts for the individual's commitment to resist. The Pueblo incident serves as an illustration of the pitfalls that wait for us with a rigidity of dogma. In a recent opinion in *Army Times*, retired Lieutenant Colonel H. W. Smith wrote: "To my knowledge, no one has laid claim to authorship of the Code, although it may well be that one or more persons, likely within the Judge Advocate General's Department of the Army, or possibly within the structure of the Secretary of Defense, were the misguided authors. At any rate, I feel certain that if the then



President Eisenhower had not become enamored of the deathless prose, a more rational-minded judge would have decreed, "Back to the drawing board!"

In a paper prepared for the Air Force after Korea, author A. D. Biderman has the following opinion on the measures to counter enemy propaganda usage: "The major reliance will have to be placed on the effective application of measures which can be applied by the Air Force, and the government as a whole. They include the judicious use of propaganda and counterpropaganda instruments; effective diplomacy; the application of measures for insuring the security of information by intelligent dissemination to personnel vulnerable to capture; by taking the possibilities of the compromise of significant information into account in the design and planning of equipment and operations, etc." An-

other opinion is that offered by an escapee of the Vietnam conflict. Major J. N. Rowe, who states, "Our biggest problem is the lack of a central repository from which training staffs may draw material on survival, evasion, resistance and escape."

I would suggest, also, that it is absurd to implement changes in phraseology to satisfy existing political conditions. What conduct is realistic to expect from a PW? S.L.A. Marshall, an author of the Code, wrote in the *New York Times*: "I grant that there is an ambiguity here, to which I objected at the time the Code was written. But the commission's view was that the wording had to stand that way since each service had a different problem. For example, the average rifleman could discuss almost anything that came into his mind, whereas a bomber pilot would have to be most guarded in his statements."

The variety of opinions on the Code would baffle the most knowledgeable staff officer who was charged with developing new guidelines. The crux is to develop a more realistic attitude in using this tool. The services must direct their training so that the serviceman can adhere to the Code without fear of his physical and mental well-being and, more central to the issue, his self-respect. This denigration of the individual is the captor's most effective tool and one used throughout their political doctrine. The son of the former commander in chief of US Forces Pacific during a major portion of the Vietnam War and a PW for five years opined the following: "Once you become a prisoner of war, then you do not have the right to dissent, because what you do will be harming your country. You are no longer speaking as an individual, you are speaking as a member of the armed forces of the United States, and you owe your loyalty to the Commander in Chief, not to your own conscience."



CPT DAVID J. MATTHEWS

III was commissioned in Infantry through the ROTC program at Southeastern Massachusetts University in 1967. He is a 1974 graduate of the Armor Officer Advanced Course and has served as a platoon leader in Vietnam, a training unit commander and as a division staff officer. Captain Matthews is currently serving as a combat support company commander with the 8th Infantry Division in Europe.

antitank guided missile defense

by Captain Bryant B. Hamaker

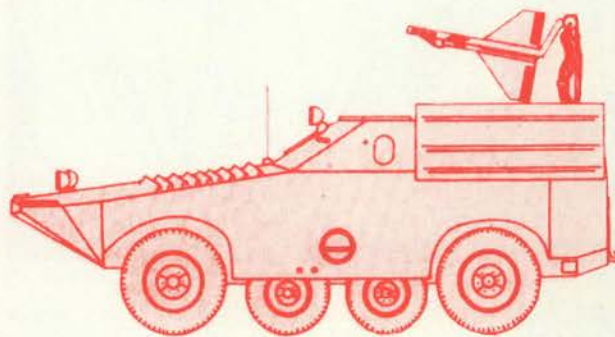
The effectiveness and high kill probability of antitank guided missiles (ATGMs) was clearly demonstrated during the October War of 1973. The purpose of this article is to offer recommendations for defensive and evasive measures which armor units may employ to facilitate maximum protection from enemy ATGM attacks.

New techniques of movement have been introduced and implemented as one means to counter the ATGM threat. Alone, however, they do not respond to the lethality of the ATGM. Therefore, additional techniques are needed. However, before we proceed any further, two important assumptions must be recognized:

(1) ATGMs will continue to be employed on the modern battlefield in ever-increasing numbers.

(2) ATGM crews will be able to engage tanks by surprise from prepared or favorable positions which represent a series of ambushes.

Recognizing the aforementioned assumptions, the following recommendations are made.



White Phosphorous (WP) Overwatch

This is a technique which could be employed by the overwatching section of an armor maneuver element. When combined with the new techniques of terrain driving, WP overwatch will reduce the kill probability of ATGMs.

Simply stated, one tank of the overwatch section, or one platoon if platoons are used in an overwatch posture, would carry WP indexed and loaded in the

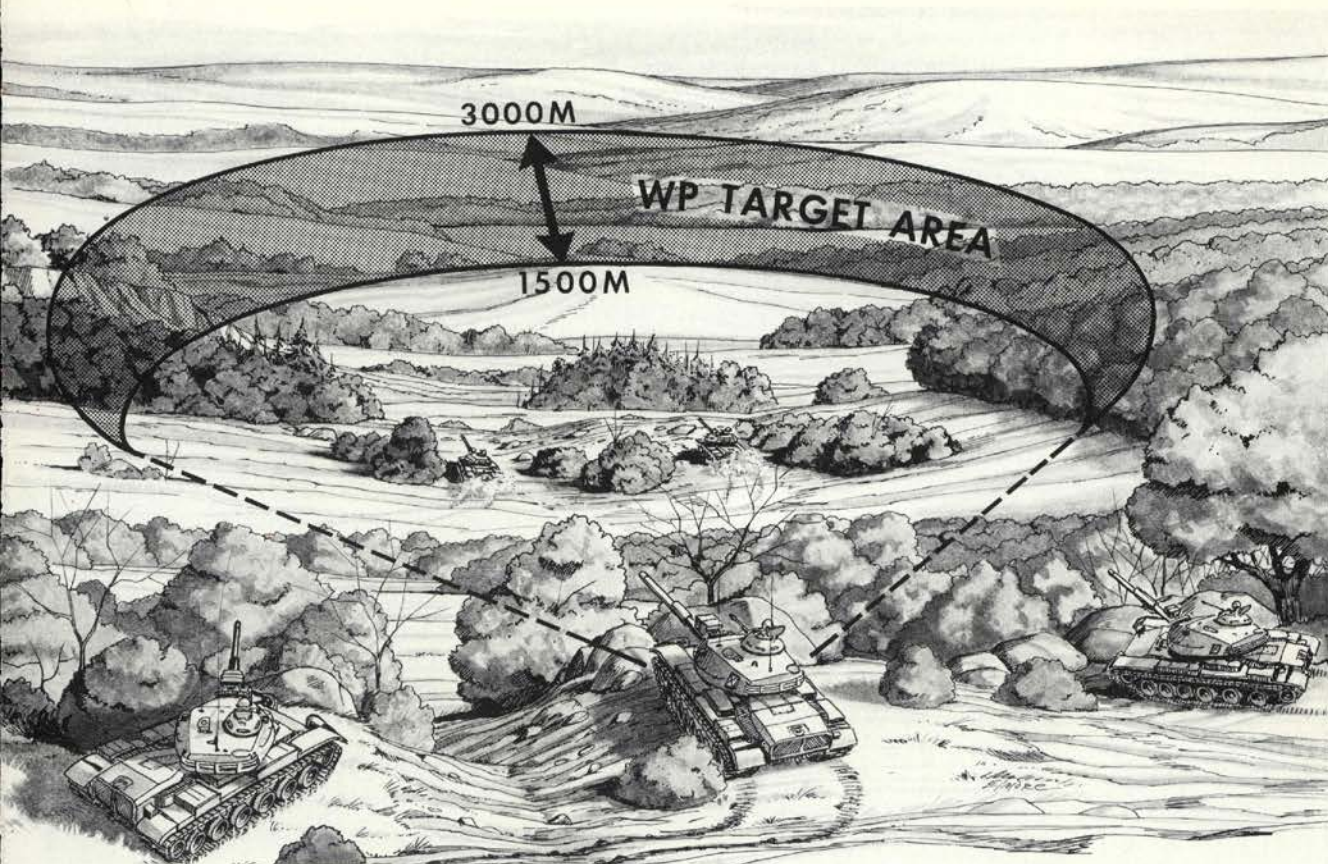


Figure 1

Illustrations by Larry Elmore

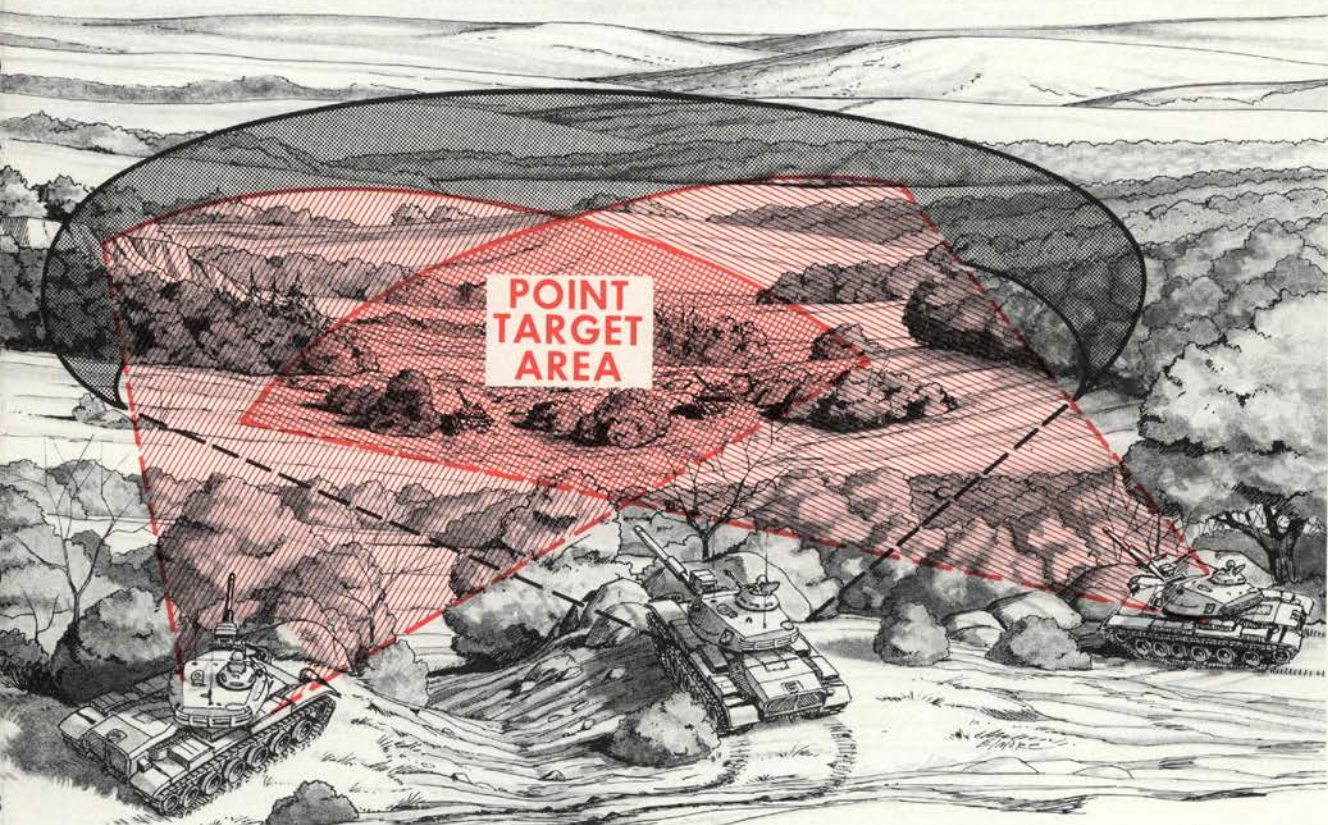
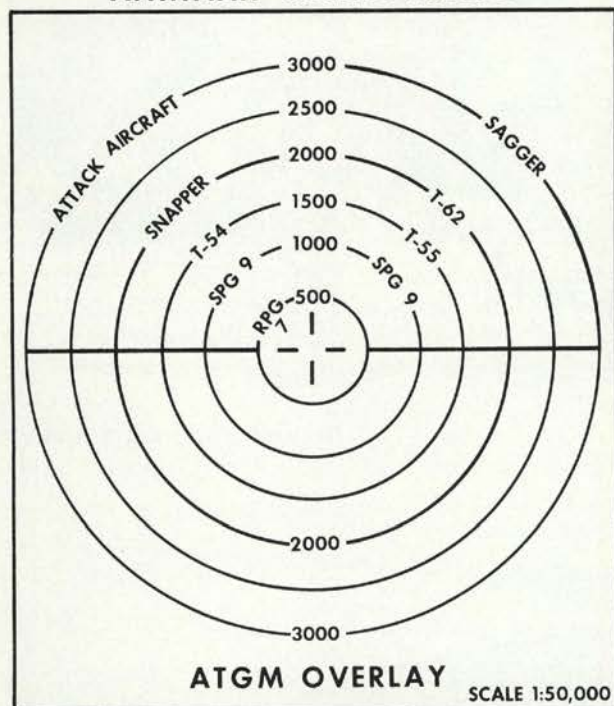


Figure 2

main gun (see figure 1). That tank would have the responsibility of "searching" for ATGM sites or launch signatures at ranges of 1500 meters (control distance) to 3,000 meters (maximum range) from its position in the overwatch. Upon detection, the tank commander would make a range estimation to the target and fire the WP round. (It must be noted that it is not the intended purpose of the WP round to strike or destroy the target because the inherent characteristics of the round at ranges in excess of 1500 meters indicate a target hit is improbable, al-

ANTITANK GUIDED MISSILE



Overlay shown is 2/3 actual size.

Figure 3

though quite acceptable.) The primary intent in using the WP round is, (1) to distract the ATGM gunner causing loss of sight picture and, (2) to obscure the maneuver section from the ATGM gunner's view by creating a smoke screen. The tank or tanks firing WP would continue to fire until either an effective smoke screen is established and effective indirect fires could be initiated, or until the maneuver section has moved out of the ATGM danger zone.

The remaining tanks (see figure 2) in the overwatch section would cover the maneuver element by "searching" the area out to ranges of 2,000 meters. It is within this range that the tank could place effective direct fire on the ATGM site or launch signature. The 2,000-meter zone was decided on because of the higher probability of first round hit by the tank main gun. Conversely, at ranges beyond 2,000

meters, probability of first round hit decreases from 20 per cent to less than five per cent at 3,000 meters. This final point is based on the simplified weapons system in the M60A1.

The technique could be employed at platoon, company or company team with minimum loss of antitank capability. It could prove especially valuable since the current family of ATGM requires the gunner to sight and track a target from launch to target hit. If the enemy does not possess ATGM capabilities, this technique would not be used.

ATGM Overlay

The ATGM Overlay (see figure 3) is envisioned as a practical tool which has three primary functions. First, the overlay would serve as an aid to assist tank commanders in range estimation to both suspected and known ATGM sites or launch signatures. Second, it will serve to remind tank commanders of the various types of enemy antitank weapons and their inherent capabilities. Third, utilization as a training tool for inexperienced or new tank commanders and crews would greatly enhance the ability of the crew to survive on the modern battlefield.

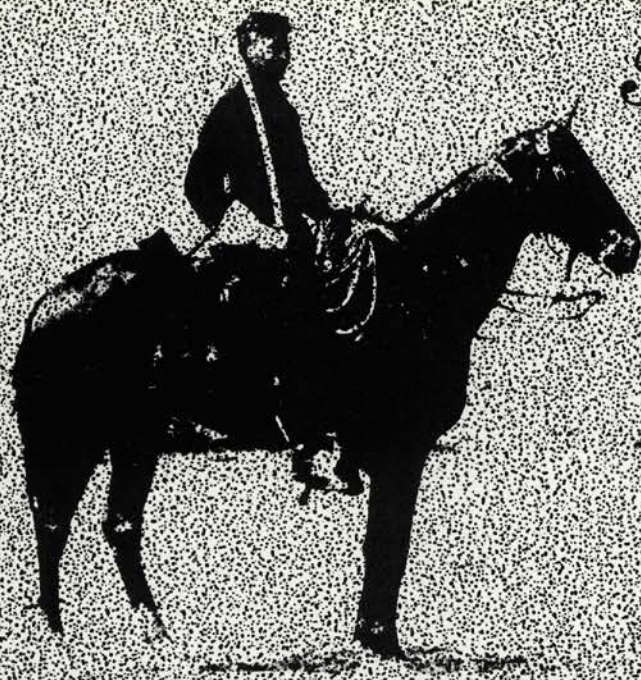
The overlay could prove to be a valuable asset if the "WP overwatch," mentioned earlier is employed. The designated WP commander and the remaining commanders in the platoon or team would have a handy reference to potential targets based on their map location.

The ATGM overlay is scaled to one to 50,000 and constructed of clear plastic. The size facilitates easy fit into either the fatigue or field jacket pocket.

Although not all-encompassing, the methods mentioned herein should serve as sound defensive and evasive measures whose end product is the same; the increased combat effectiveness of the armor unit.



CPT BRYANT B. HAMAKER received his commission in 1966 upon graduation from Infantry OCS. He served as a platoon leader and executive officer with the 9th Infantry Division in Vietnam. He has also commanded two companies in the 9th Infantry Division at Fort Lewis, Washington. Captain Hamaker is currently attending the Armor Officer Advanced Course.



The Black Hawks Bid Farewell to the Horse

MAREA, TEXAS—December fourteenth, 1932, is a date that will be long remembered by all personnel of the First Cavalry (Horse). For nearly 100 years the First Dragoons had set the standard for the mounted service, and now the time had come for a final mounted formation, for a long farewell to the faithful animals which had served their masters so well. The mechanization of the regiment was at last to become a reality.

The day dawned clear and cool, and everywhere on the post there were signs of orderly activity as the troops prepared to turn out every horse and man to take part in the final ceremony.

The buglers sounded Adjutant's Call and the squadron moved forward at a trot to their positions, sabers were drawn and the regiment presented to its commanding officer. The last review was under way.

Even the horses being led, and there were many in ranks, seemed to sense the solemnity of the occasion. As the successive lines passed the reviewing stand at a slow and measured walk, they dressed smartly to the right. Sabers flashed in the bright sunlight as each succeeding platoon approached and passed the colonel and his staff—guidons dipped in a "hail and farewell".

The enlisted men entitled to become Knights of the Black Hawk were to be inducted into that organization. These men had served in the First Cavalry for at least one enlistment and had earned a character of "Excellent" on their last discharge. They were drawn up in a single rank with the regimental standards in the center. Behind them were ranged the men who had previously been made

Knights of the Black Hawk, and in a third rank were the men who had not yet earned that honor.

Following the ceremony, Colonel William A. Austin, the commanding officer of the First Cavalry, addressed the unit.

At the conclusion of the Colonel's remarks all officers and enlisted men of the regiment dismounted, faced toward their horses, uncovered, and with their right hands on the polls of their mounts, stood for a long moment in a silent farewell to their faithful servants.

As the men faced again to the front, "Louie," patriarch Knight of the Black Hawk, the oldest horse in the First Cavalry, caparisoned in black, with the regimental crest adorning his right side, was led across the front of the regiment.

Then the stirring notes of "Boots and Saddles" were sounded by the massed buglers, and the regiment mounted up. But it was the last "Boots and Saddles" to be played in the First Cavalry and so, when mounted, all uncovered and the sweet, melancholy tones of "Taps" were heard. As the last notes died out, the band commenced to play "Auld Lang Syne," and the men of the regiment dispersed to return individually to the stables. The standard bearers dismounted and bore the colors from the field.

Thus the oldest Cavalry Regiment in the United States passed from its proud estate as a horse mounted organization and left for Camp Knox, Kentucky to be equipped with the T4 Armored Car.

Submitted by Captain Thomas E. White

AN EVALUATION OF OFFICER EVALUATION REPORTING

by Lieutenant Colonel William P. Clary Jr.

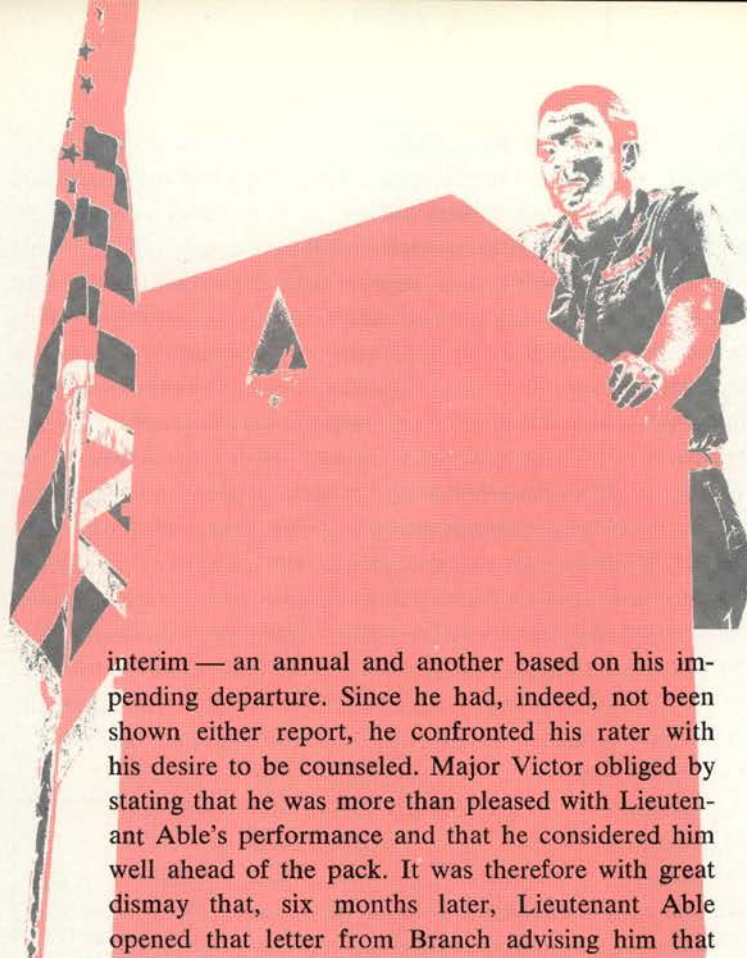
It is August 1961 in a small Kaserne somewhere in West Germany. Lieutenant Able moves quickly into the crowded battalion classroom. He has heard that the new Officer Efficiency Report (DA Form 67-5) which goes into effect next month will be the subject of this afternoon's battalion officers' call. Lieutenant Able ponders the current reporting system. He sees nothing really wrong with the old Form 67-4. Sure, inflation may be a problem, but the form is simple enough and besides, Lieutenant Able has gotten top marks thus far in his early career. In less than three years service he has established an OEI of around 140, and didn't his company commander say during his last counseling session that the report card he'd received was the best he's given a lieutenant in seven years of service?

Lieutenant Able's thoughts were ended by the voice of the battalion adjutant calling the assemblage of officers to attention. The battalion commander, Lieutenant Colonel Bravo, strode in and took the lectern.

"Good afternoon, gentlemen. Please be seated. As you have been told, I have decided to devote this month's officers' call to the new 67-5 which becomes effective the first of next month. Captain Jones, the battalion adjutant, will show you the report and explain the mechanics of its preparation in a few minutes, but first I want to tell you some of the thoughts that went into this report and provide you with some guidance which will prevail in this battalion. As many of you have read, the 67-4 is being replaced by the Department of the Army (DA) due to many recognized deficiencies. The greatest of these is a lack of discriminators to differentiate among top performers. This has been further aggravated by the growing problem of inflation which the new report should largely eliminate;

however, inflation cannot be eliminated by the form itself! It must be eliminated by raters and endorsers. Gentlemen, it will be eliminated! This has been spelled out by everyone from the Chief of Staff of the Army to the corps and division commanders. Let me now be more specific. On the back of the 67-5 you will find a pyramid of one hundred men arranged according to performance. The categories range from 'outstanding' to 'inadequate.' The pattern depicted represents the normal distribution that the Army would expect in a random group of one hundred officers. This means that the best performer in this battalion would be scored 100 and the worst zero. Accordingly, the average officer should get 50, and above average officer above 50, and a poorer than average officer below 50. Now this is precisely what I expect to see, and this is the philosophy upon which I intend to base my reviews. You will also note that this report is *not* to be shown to the rated officer — another measure DA has taken to combat inflation. I expect your implicit compliance! Captain Jones will now go into more detail in explaining the mechanics of . . ."

Little did Lieutenant Able realize the impact that Colonel Bravo's interpretations and guidance would have on his career. A month following the implementation of DA Form 67-5, Lieutenant Able was reassigned. Due to his demonstrated performance in C Company he was given one of the toughest staff jobs that a lieutenant was to perform and he leaped at the chance of filling a captain's slot, even though he would be competing with considerably more experienced officers. Lieutenant Able liked his new job and performed in an eager and conscientious manner. He required little supervision and received even less. In fact, when it came time to return to CONUS a year later, Lieutenant Able was surprised to learn that he had received two reports in the



interim — an annual and another based on his impending departure. Since he had, indeed, not been shown either report, he confronted his rater with his desire to be counseled. Major Victor obliged by stating that he was more than pleased with Lieutenant Able's performance and that he considered him well ahead of the pack. It was therefore with great dismay that, six months later, Lieutenant Able opened that letter from Branch advising him that they were seriously concerned, based on recent reports, that his performance was slipping. Since he may not have been apprised of the reports in question, Branch had deemed it advisable to provide extracts of the reports in question and to invite Lieutenant Able to visit Branch upon his return to CONUS to see the reports first-hand. Fortunately for Lieutenant Able, his next assignment proved to be a company command in which he excelled; thus the damage received during his prior assignment was minimized, albeit lasting. Were Lieutenant Able to know then that regardless of future performance his record had been permanently blemished by Colonel Bravo's strict interpretation of the guidelines, it is doubtful that he would have remained on active duty since his unfortunate experience effectively removed him from competition for such sought-after plums as secondary zone promotion, battalion command and senior service college.

Over ten years later a similar but different scene takes place at a CONUS installation. It is December 1972. Lieutenant Young, a rifle platoon leader, listens intently as his battalion commander, Lieutenant Colonel Strong, explains the new Officer Evaluation Reporting System (OERS). The DA Form 67-7 is to go into effect next month in calendar year 1973. Lieutenant Young is particularly concerned, for he has established an excellent record, yet he

has heard several more senior battalion officers comment that it is easy to "get hurt" whenever the system changes. He has also read about the benchmarks that DA will announce to get the ball rolling. Colonel Strong is now addressing these very points. Let's listen in. "... and as I have mentioned, gentlemen, these 'benchmarks' are to be considered as a guide only. Bear in mind that they were developed under carefully controlled conditions that will never be fully duplicated. The reports from which these hypothetical averages came were prepared by raters on unknowing subjects whose careers would never be affected by the reports in question. Only under such artificial circumstances is it possible to obtain total objectivity. We are now moving from the hypothetical into the real world with this report. I therefore caution you to exercise all the judgment and discretion that your experience and intelligence will allow. Your prime objective should be total fairness to the rated officer — and to his contemporaries. If you can look back three years from now to a report you prepare next month, and remain convinced that it is valid then as it is now, then you'll have done your bit toward making this thing work."

What a difference from the guidance given by Colonel Bravo under similar circumstances 11 years ago! Needless to say, Lieutenant Young and his fellow officers in this battalion can expect little adverse impact during the implementation of the new report. But what is the difference between this situation and the earlier one other than time and place? The answer is luck! In the case of Lieutenant Young, the good fortune of having a commander who possessed sufficient intelligence and fortitude to protect the welfare of his officers during a time of potential danger.

The situations I have described illustrate what must be considered one of the greatest potential weaknesses in the Army's Officer Efficiency Reporting System — the ability of unintentionally harming an officer's career through failure to understand the system or through overreaction to guidance from DA. Each time our system changes, the Army goes through this painful process of adjustment until, through good and bad experience, education prevails and the system seeks its own level world-wide. Then DA decides improvements are needed, the system is revised, and the wheel is reinvented.

In an organization the size of the Army, wherein it is impossible to know all officers by name, faces

and manner of performance, an efficiency reporting system of sorts will always be required. Recognizing human frailties, perfection will never be achieved. There are, however, certain steps which can be taken to minimize the dangers described.

First, consider the benefits of simplicity. The old 67-4 was pretty well understood — there were only five categories in which to place an officer. Even if throwing darts, a rater had a 20 per cent chance of being right! Now compare that with the one hundred choices which confronted the rater on the 67-5! The benefits of simplicity are great.

Second, once we have adopted a simple report, let's keep it for at least ten years! The most direct method of solving the manifold problems associated with a change in the reporting format is simply not to change it.

Third, what's wrong with the old OEI or something akin to it? We threw it out in 1961 with the adoption of the 67-5, but the report was scored anyway. (We simply didn't understand what the score meant!) Composite scores were discontinued with the 67-6. However, branches continued to score it on their own in order to prepare OMLs for promotion and school selection. Commanders kept their own "cheat sheets" to attempt to gain some consistency from the verbage. The 67-7 recognizes the need for a composite score. An OEI is a useful common denominator for DA, and it serves to keep the officer better informed about himself.

Finally, it should be possible for an officer to overcome an isolated experience, such as in the case

of Lieutenant Able. An OEI tends to do this, for it smooths out the peaks and valleys. Another method is to less heavily weigh, or even totally discard, reports of older vintage. When compared to many "fresh" reports in positions of responsibility, just how important is that skeleton that's been hiding in the back of a 201 file for 15 years? Will it really have any bearing on Lieutenant Able's performance as a battalion commander in 1975?

These are measures that should be taken to improve the reliability of the Officer Efficiency Reporting System, but there is an added ingredient of equal significance. The Army must exercise caution and restraint in providing guidance when implementing a new report. DA must anticipate overreaction and misinterpretation. Education and experience are far better teachers than is sterile, idealistic guidance which few of our senior officers accept.



LTC WILLIAM P. CLARY JR. was commissioned in Armor upon graduation from the United States Military Academy in 1958. He has served in various command positions in Germany, Vietnam and CONUS. Colonel Clary is presently assigned as Branch Chief, DCSPER, FORSCOM at Fort McPherson, Georgia.

DID YOU KNOW?

WHY SILVER "RANKS" GOLD

When epaulettes were abolished from the uniforms of regimental officers in 1872 and replaced with shoulder knots which had no fringes, it became necessary to devise some insignia for the major to distinguish him from the second lieutenant. So the gold leaf was adopted to denote majors. This is why the lieutenant colonel has a silver insignia and the major wears gold. At the same time that this change was taking place, the color of the bars of junior officers on shoulder straps was changed to silver. The second lieutenant wore no insignia and was distinguished only by the shoulder strap or knot.

The need for insignia to denote the rank of second lieutenant first became apparent when the Army adopted khaki uniforms in the Spanish-American War and officers and men alike wore plain shoulder straps. But it was not until 1917 that the Army decided to adopt a new insignia for him. The plan which would call for the least possible change was to follow the color precedent established in devising the major's insignia and adopt the gold bars.

*From Military Customs and Traditions by Mark M. Boatner III
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FROM THE **ARMOR BRANCH CHIEF**

COL JOHN R. BYERS



Branch Chief's Comment

There are some major changes being made in the officer career management system which will have an impact on every Armor officer. We want to be sure you know about them in advance. As you already know, the Officer Personnel Management System (OPMS) is well down the pike and is already showing its benefits. Officers are receiving recurring assignments in their specialties, becoming better trained and giving the Army better service through their increased expertise. At Branch, we need to do everything we can to keep this program moving ahead.

One of the things that needs to be done is to insure that each officer receives the same attention and conscientious career management in his alternate specialty that he gets in his primary. We couldn't create some 40-odd branches to manage the OPMS specialties, so the alternative was to reorganize OPD. The announcement of this change was made in a January issue of *Army Times*. As that report stated, planning for this reorganization is underway now and will become effective at the end of June 1975. Elsewhere in this section is a more detailed explanation of the changes and the benefits that we are confident the officers corps will receive from the reorganization.

Undoubtedly the most apparent change is the break with tradition in eliminating the Branches at OPD. While this may seem at first glance to be calamitous, it is in fact a fairly minor change and is consistent with OPMS. The only person actually leaving is the Branch Chief; all the other Branch members remain but just in different divisions. There's an Armor section in every division that handles Armor officers, and the same people that have been working with you in the recent past will stay on. While in Armor assignments, all Armor

officers will still be managed and assigned by Armor career managers.

Specialty managers throughout each field grade division will be responsible for the professional development and assignment of individual officers. This means that a lieutenant colonel with Armor as his primary specialty would direct all his requests for information and assistance to the Lieutenant Colonels Division's Armor Specialty Manager. An Armor lieutenant colonel with Information as his primary specialty would deal with the Information Specialty Manager in the Lieutenant Colonels Division. Thus, the individual officer will normally look first to his primary specialty manager for guidance, assistance and professional development advice; however, this does not preclude an officer from seeking guidance from his alternate specialty manager.

This change will streamline OPD, will give each officer better overall career management and will continue to provide the same personal attention and service that the Branches have given in the past. Everyone in OPD is very conscious of the concern that our officers in the field may have about "who in DA is looking out for me now." Because of our awareness of that concern, we'll be trying extra hard to guarantee dedicated, unwavering service. From experience, I'd guess there may be a few instances where something may fall through the crack, but we'll all be working to locate and close those cracks during our initial growing stages. You can be assured that every officer here in OPD has your best interests at heart.

OPD Reorganization

The Officer Personnel Directorate, HQ MILPER-CEN, will undergo a major reorganization during the period July to September 1975. The organizational

realignment is being made to better provide for the professional development and utilization of officers under the OPMS.

Over the years the current OPD organizational structure has efficiently supported the concept of officer management which accounted for and distributed officers on the basis of branch and grade. Under OPMS, however, officers will be managed by OPMS specialties and grade. This means, for example, that the Armor major whose alternate specialty is Information needs to get the same attention and development in his Information specialty as he does in his Armor assignments. We can't quite do that under the present organization.

By next fall, all field grade officers will be managed within divisions based on respective grades. Like Army colonels who have enjoyed this form of management since 1962, all majors and lieutenant colonels, regardless of their branch identification, will be managed by specialties within the new Majors and Lieutenant Colonels Divisions respectively. Within the three field grade divisions, each headed by a colonel, there will be a Professional Development Branch, a Support Branch and multiple specialty management elements (see figure 1).

In examining the role of the career branches under OPMS, it was determined that management of company grade officers by specialty and grade within the current branch framework would be more desirable, providing these officers with a sense of organizational identity and pride. Therefore, these familiar career branches will be retained within the three new company grade divisions — the Combat Arms, Combat Support Arms and Combat Service Support Divisions — each headed by a colonel. Armor officers, of course, will be in the Combat Arms Division. The branch chiefs within each of the three divisions will be lieutenant colonels (John Toolson will be ours) and the creation of professional development branches within each division will insure continuity of officer development throughout the company grades.

In view of these reorganizational changes, the Officer Personnel Directorate foresees the assignment officer playing a greater role than today in the professional development of those officers for whom he has assignment responsibility. The professional development officer and the assignment officer will be free to coordinate with their counterparts in the other divisions as well as those at the deputy level. Within the Office of the Chief for Professional Development, there will be a Specialty Monitor Branch

which will be responsible for bringing together the efforts of the division professional development officers. Further, the specialty monitors will act as the point of contact for outside agencies desiring to coordinate plans and policies regarding any of the specialties.

The reorganization of OPD is being carefully managed to insure a smooth transition from our current branch and grade system to a specialty and grade system. We'll keep you posted on progress as dates and changes are determined.

ARMOR Replaces the Newsletter

A few months ago we told you in this column that because of funding constraints, Branch would be publishing the *Armor Newsletter* only semiannually instead of quarterly. Before that notice even appeared in print, however, newsletters of all the branches were cancelled. The money simply isn't available. There'll continue to be items of personnel interest published in *TIPS* and *Army Times*, but these will be of general interest primarily. In order to keep you abreast of happenings in *Armor*, we'll be using this space much more. The editor is giving us an additional page so we can get more information to you. It's important that every one of us continues to subscribe to *ARMOR*, not only to stay current in technical matters and to support the Association in its work, but also now to keep us up to date on those personnel matters that directly affect our careers.

FY 76 Civilian Schooling

The following is an update by program of the civilian school situation for FY 76. Because of funding reductions, selection for all civil schooling programs is limited, and in almost all cases for company grade officers, successful company command and attendance at the Advanced Course are prerequisites for consideration. Further, selection for advanced civil schooling requires three other essential elements: an academic background sufficient to gain graduate school acceptance, an outstanding performance record and availability. Civil school applications are accepted at anytime and remain active in your Branch file until you're selected or otherwise become ineligible.

Contact the Professional Development Section at Branch for further details (AUTOVON 221-7838 or 221-7837).

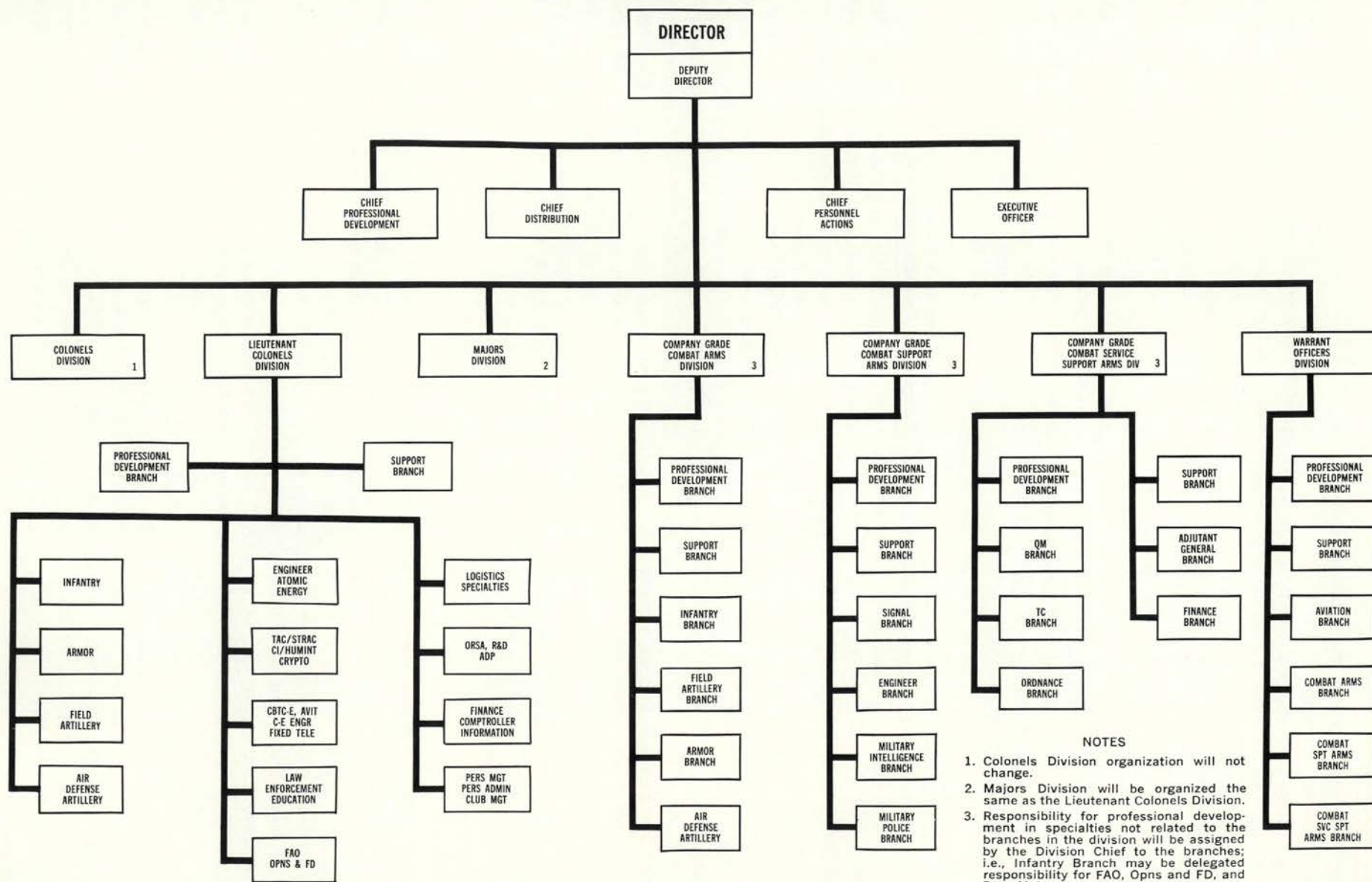


FIGURE 1

Service in Europe

The following comment was received from an Armor lieutenant in Europe:

"I am about to complete my ninth month as a platoon leader in Germany. I must say that I have found the experience extremely rewarding and have enjoyed it immensely. At present we have gone through company tests, Grafenwohr, Reforger, and platoon tests. I can honestly say that Germany is a must for a young officer who is career-oriented. This is unfortunate in that peers try to discourage one another from choosing Europe due to a variety of factors, the foremost being field duty. I have found this command and my tour thus far to be what I consider the building blocks of my career."

Fully-Funded Advanced Civil Schooling

Armor Branch has a total of 19 openings in the following disciplines for graduate civil schooling during FY 76. If you're interested, apply under provision of AR 621-1, dated 1 June 1974. Officers accepted for schooling under this program will serve a three-year utilization tour immediately following graduation.

- Journalism (2)
- Comptrollership (3)
- Area Studies (5)
- Operations Research/Systems Analysis (Business) (3)
- Operations Research/Systems Analysis (Engineering) (2)
- Automatic Data Processing (Business) (1)
- Automatic Data Processing (Engineering) (1)
- Electronics Engineering (1)
- Social Psychology (1)

Advanced Degree Program For ROTC Instructor Duty (ADPRID)

Branch has a total of 35 openings for officers in the grade of captain or major to enter graduate school in FY 76 for the purpose of obtaining a graduate degree and remaining at the same institution to serve a three-year tour as an ROTC instructor. Officers entering the ADPRID program in FY 76 will study an academic discipline for which the Army has AERB validated requirements. These educational requirements are identified in a DA circular entitled "Graduate Level Training of Military Personnel at Civilian Institutions," dated 10 April 1974. If interested, apply under the provisions of AR 621-101, dated 1 May 1974.

Partially-Funded Undergraduate Degree Completion Program (BOOTSTRAP)

This is the only program whereby an officer can receive full-time civilian schooling to complete an undergraduate degree. Considering the potential demand for this program, Armor Branch spaces are extremely limited and officers are urged to reduce their schooling requirement to the absolute minimum before applying. The maximum allowable period for schooling under this program is 18 months; however, in fairness to all concerned, priority for selection will go to those requiring the least amount of time. Branch applicants currently being approved have reduced their requirements to a year or less. If interested, apply under the provisions of AR 621-1, dated 1 June 1974. We can send 70 officers.

Partially-Funded Advanced Degree Completion Program (BOOTSTRAP)

The purpose of this program is to allow officers who have completed most of their graduate degree requirements through off-duty study the opportunity to complete their degrees through a period of full-time study. Officers will normally not be approved for this program unless they can complete their graduate degree in six months or less. Officers selected in FY 76 will study an academic discipline for which the Army has AERB validated requirements and will serve a three-year utilization tour. These educational requirements are identified in the DA circular entitled "Training of Military Personnel at Civilian Institutions." If interested, apply under the provisions of AR 621-1, dated 1 June 1974. We have quotas for 22 officers.

Record Brief

Beginning 1 April 1975, the Army will use a revised version of the Officer Record Brief (ORB).

A MILPERCEN committee spent a year reviewing the ORB and its use and as a result of that year's experience, came up with several readily apparent changes which will improve the use of the form as a personnel management tool.

The format has been revised to group together related data items, making it easier to review and permitting the form to be folded for more convenient filing.

The committee has revised some data elements and added new ones to better support the implementation of OPMS.

Instructions on the reverse side of the form will be reoriented toward the individual officer and per-

sonnel specialist; more complete explanations of code and abbreviations will be included.

More space has been added for listing and detailing assignment history. Up to 19 previous assignments (five more than before) will be listed, and duty positions are more fully described.

Another administrative improvement will reduce delays in resolving questionable data changes, while training field personnel in correct audit procedures. Now, military personnel officers will be receiving a letter from MILPERCEN in cases where the officer auditing his brief attempted to make a change incorrectly or failed to supply sufficient information to post to the automated file. This feedback will help in reaching the goal of accurate, timely records, especially as the system moves beyond the initial audit cycle with its relatively larger volume of corrections.

OER Appeals

Change 4 to Army Regulation 623-105 has done away with the policy of precluding an appeal of an efficiency report which was part of an officer's official record when he was selected by a DA selection board for an earlier promotion.

Time limitations remain unchanged however. An appeal of a report submitted on DA Form 67-7 must be submitted within two years of the "thru" date of the report.

A five-year time limitation has been established for the appeal of reports submitted on DA Form 67-6 and earlier report forms. A report beyond this time limitation is not subject to appeal if it can be determined conclusively by MILPERCEN that the appellant had knowledge, for at least two years, of the existence in his official record of the report in question.

The five-year period commences on the day following the ending date of the report concerned. The two-year period relative to the officer's knowledge of the existence of the report will be determined from the dates of his appeal and his personal review of his Official Military Personnel File (OMPF) or career branch file.

Command and General Staff College

For those officers enrolled in the Army's Command and General Staff College nonresident instruction program and who will complete Phase IV of their instruction prior to June 1975, an opportunity now exists to complete the entire program and obtain a CGSC diploma in one seven-week resident phase at Fort Leavenworth. Known as Part I (3

weeks) and Part II (4 weeks), the instruction will be conducted during the months of June and July 1975.

To be eligible for Part I, an officer must have satisfactorily completed, but not gone beyond Phase IV of the program. For Part II, eligibility requires completion of either Part I or satisfactory completion of but not more than Phase V of the program. In June and July of last year, three Armor officers attended Parts I and II.

Further, if you haven't been to CGSC and are in your last couple of years of eligibility you should consider enrolling in the NRI program. It's a good way to go and completion makes you eligible for a number of key assignments.

Have You Recently Gone to a Voluntary Indefinite Status?

You should advise your servicing Finance Officer at once that you have elected to remain in service. He must submit JUMPS input to change your ETS to indefinite, since otherwise your pay account would automatically become inactive based on current month of ETS. And we sure don't want that to happen! Block 39 of your Leave and Earnings Statement shows the ETS data recorded on your pay account. When ETS is indefinite, block 39 is blank. A copy of the letter which approves your extension of service will be required by the Finance Office to substantiate this change.

Planning to Retire?

The four ROTC regions are responsible for and administer the Retired Administrator and Instructor (RAI) program for Junior ROTC units throughout CONUS and they are the initial point of contact for this program in overseas Junior ROTC units (Europe, Puerto Rico, Hawaii, Guam, and Alaska). This program offers responsible positions with Junior (high school) ROTC units to qualified retired officers. The concept is to use the experience and ability of retired Army officers in the Junior ROTC Program. Normally, retired officers employed in this program head up the entire Army junior program at the hosting school or institute. They are the equivalent of the active duty Senior Army Instructor (SAI). The pay varies but is at least the difference between the officer's retired pay and the current active duty pay for the grade in which he is retired. □

TEC UPDATE

Throughout the Army, combat arms battalion learning centers are offering new audio-visual lessons produced by the Training Extension Course Division, Army Wide Training Support Department of the Armor School. These audio-visual lessons are designed to provide the 11D Reconnaissance Specialist, 11E Tank Crewman, and 11ER8 Reconnaissance Vehicle Crewman with individually-paced instruction to enhance his MOS proficiency. The learning centers are equipped with Beseler Que-See projectors that accommodate an 8mm film loop and tape cassette that are used for presenting the lessons. The following TEC lessons have been completed, or are in final production stages, and it is expected that all will be in the hands of appropriate units when this article is published:

M48A1 TEC Lessons

The Armor School is in the process of preparing special training material for those Reserve component units equipped with the M48A1 tank. The material will include Training Extension Course (TEC) lessons, TV Tape lessons, Audio-Only Tape lessons (with supporting supplemental texts), and a variety of printed instructional/reference material. The entire series will deal with subjects directly related to the M48A1 tank. The TEC and Audio-Only lessons are being developed to teach various individual and crew duties, whereas the TV Tape lessons will provide training to transition qualified tank crewmen to the M48A1. An initial packet of printed material was mailed to appropriate units in January. Additional printed material will be distributed as it becomes available. Distribution of Audio-Only and TV lessons will begin in March, with the final lessons in this group scheduled for delivery in the first quarter of FY 76. Production of TEC lessons on the M48A1 will begin in early FY 76. Availability dates will be published when firm delivery schedules are known.

INITIAL FIRE COMMANDS,
SELECTING M60/M60A1 AMMUNITION
HANDLING M60/M60A1 AMMUNITION
PREPARING THE CIRCULAR RANGE CARD
M60/M60A1 PREPARE TO FIRE
105mm Main Gun: Boresight, Part I
105mm Main Gun: Boresight, Part II
Coax Machine Gun, .50 Caliber Boresight
Searchlight Boresight
Zeroing Main Gun and Machine
Guns and Setting the Battlesights
M60/M60A1 DIRECT FIRE CONTROL SERIES:
Placing the Turret in Power Operation
Operation of the Range Finder, Part I
Ballistic Computer Operation
M60/M60A1 MAINTENANCE SERIES:
Before Operations, Part I
Before Operations, Part II
During Operations and at Halt
Maintenance Checks and Services
After Operations, Part I
After Operations, Part II
105mm GUN SERIES:
Loading
Misfire Procedures
Unloading

TRAINING SUPPORT UPDATE

The correspondence subcourses listed below are now available. Individuals may obtain them by mailing a completed DA Form 145 to the Assistant Commandant, USAARMS, ATTN: ATSB-TS-CC, Ft. Knox, KY 40121.

ARM 179 Air Cavalry/Attack Helicopter Units — NEW

History, mission, and organization of air cavalry and attack helicopter units; their relationship with ground elements and differences in employment considerations.

ARM 405 Armor Vehicle Maintenance — REV

The Army Maintenance Management System (TAMMS); maintenance evaluation; crew maintenance of the M60, M60A1, M113A1, M551, and M114A1E1; and vehicle inspection techniques.

ARM 566 Offense Planning — NEW

Planning an offensive operation at task force level; and application of the estimate of the situation to an offensive mission with emphasis on mission analysis, determination of available courses of action and recommendation of a course of action.

ARM 567 Coordinated Attack — NEW

Planning and conduct of a coordinated attack by a tank task force; actions and orders during the attack to changes in the enemy situation and to specific enemy reactions and consolidation and reorganization on the objective.

CORRESPONDENCE COURSE INFORMATION

All correspondence course administration has been computerized as a result of the recent conversion of all records to the TRADOC Educational System (TREDs) which uses a central computer at DA. As a result, there has been some loss in personal contact with correspondence course students and at various times we have experienced some delay in processing enrollments and shipping subcourse materials. Additionally, we have had cases where enrollments have not been recorded due to machinery or programming deficiencies. Units or students who do not receive a response to an enrollment application within a reasonable time, or who want information on enrollment status or on other correspondence course matters, may write or telephone the Correspondence Course Division. A reply will be provided at the earliest date.

Address Assistant Commandant
US Army Armor School
ATTN: ATSB-TS-CC
Fort Knox, Kentucky 40121

Telephone
AUTOVON: 464-5430
Commercial: 502-624-5430

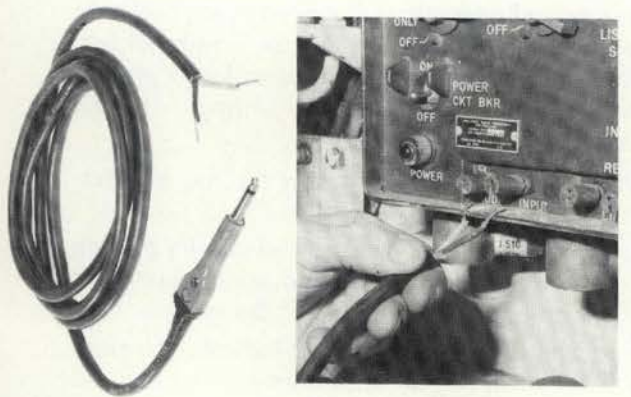
TEC Update (Audio Only)

TEC lessons also come in audio-only versions on standard audio tape cassettes that can be played on portable tape players — meaning that you can actually be on the vehicle with the equipment in front of you as you listen to the instruction.

Ideally, this audio program is designed for individual instruction. But if you're a tank commander with a crew to whip into shape for TCQC, TEC audio-only lessons could prove effective in this and similar situations. Just think a minute! Your vehicle is equipped such that with a little ingenuity and "do-it-yourself" you can integrate the tape player into the intercom system and provide instruction to all crew members while at their crew positions. A jack cord has been devised that can connect the *Voice of Music* tape player (furnished as part of the TEC kit) into the vehicle's intercom system. The jack necessary for this combination in the M60-series tank and the M551 AR/AAV can be made easily with standard materials available through the supply system. You will need:

- a) JACK, TELEPHONE: 81349; JJ-034
FSN 5935-283-1269
(Order from: TM 11-2586, Nov 55 Change 8, p. 47.)
- b) Any cable with two-conductor wire (mil-C-3432) CO. 02LLF (2/16) 0330

Attach the jack plug to the two-conductor cable and on the opposite end of the cable, strip the outer insulation from the last two inches of the two wires. Next, strip the insulation from the last three-fourths of an inch of each individual wire and solder-dip or tin the ends of these wires to prevent the strands from unraveling. Insert the jack into the tape player and the wires into the AUDIO INPUT contacts on the AM-1780/VRC. Your crew is now tuned in for audio lessons. If the tape player doesn't work, simply reverse the wires and try again.



M60/M551

To make the plug that can be used with the AN/GRC 3 radio found on the M48-series tank you will need:

- a) JACK, JJ-034
FSN 5935-283-1269
- b) CABLE ASSEMBLY, SPECIAL PURPOSE ELECTRICAL CX-1574 A/U
FSN 5995-752-2467
(Order from: TM 5965-202-15P, 15 Feb 1964 p. 7.)
- c) CONNECTOR, PLUG ELECTRICAL, U-77/U
FSN 5935-283-2950

Connect the 10-pin connector (U-77/U) to the telephone jack (JJ-034) through the cable assembly (CX-1574 A/U). Open the connector and from the inside, connect pin C to the tip of the jack. Bridge pins E and F by stripping off the protective coating on the two pins and solder a wire across them (figure 2). Then pin E should be connected to the sleeve of the jack. The reassembled connector goes to the AM-65 AUDIO receptacle and the jack goes into the portable tape player.

Maximize the effectiveness of the audio TEC lessons by making and using these simple plugs. Your crew's improved performance as a result of receiving instruction as a unit, in their crew positions with actual equipment at hand, will be your reward.



M48

AIR CAV SYMBOL

Pending revision of FM 21-30, the following military symbol has been approved for use by the Armor School to designate air cavalry units:



ON THE WAY

The new Department of Army training circulars listed below will be printed and distributed to the field during February-March 1975.

- TC 17-4, *Tank Gunner's Guide*, (M48A1)
- TC 17-5, *Tank Driver's Guide*, (M48A1)
- TC 17-6, *Tank Loader's Guide*, (M48A1)
- TC 17-15-10, *Know Your GOERs—Tips For Leaders*
- TC 71-5, *REALTRAIN—Tactical Training For Combined Arms Element*

TC 17-12-5, *Tank Gunnery Training*, will follow this group closely. A draft issue printed at Fort Knox was sent to units on the AWTSD mailing lists in February 1975.

Change 2 to the Consolidated MOS Study Guides for 11D10/20 and 11D40 and change 3 to 11D50/11E50 are now being processed for publication and distribution to units during April for use in preparing 11D personnel for the May testing period. □

HOW WOULD YOU DO IT?



A PRESENTATION OF THE US ARMY ARMOR SCHOOL

SITUATION

The armored cavalry platoon is the smallest organic combined arms team in the US Army. It is trained to operate as a team and should be employed as a unit. The platoon has its own platoon headquarters, scout section, rifle squad, light armor section; and, trailing this team to provide close and continuous indirect-fire support, is the mortar support squad. During field training exercises, the support squad is the most neglected part of this combined arms team. Why? The support squad is usually up to 1,000 meters to the rear of the platoon. They are out of sight, and communications are primarily effected by radio.

PROBLEM

You are the platoon leader of an armored cavalry platoon. After evaluating your platoon, you find that all the platoon members need training in forward observer procedures and the support squad needs training in mortar gunnery and fire direction procedures. You want to incorporate this training during the next field exercise. There are no live fire ranges or ammunition available for this exercise. How would you do it?

SOLUTION

Bring all the members of the platoon to the vicinity of the support squad position. Explain to the platoon that each armored cavalry platoon has its own organic 4.2-inch mortar support squad to provide close and continuous indirect-fire support. On occasion, the support squad may be integrated into a provisional section or platoon in order to provide continuous, massed indirect-fire support for the armored cavalry troop.

Who are the forward observers for this indirect-fire support?

- ◆ Any member of the armored cavalry platoon or troop can call for and adjust mortar or artillery fire in support of the mission.
- ◆ The scouts often call for indirect fire since they can employ reconnaissance by fire and observe the results without exposing themselves or disclosing their position.

Since everyone needs to know how to call for fire and how to adjust mortar or artillery fire on target, how do you conduct this training without live ammunition or ranges? Indirect-fire training can now be conducted using *burst simulation*. The United States Army Infantry School at Fort Ben-

ning, Georgia, is incorporating this in the mortar manual, and the Weapons Department of the Armor School at Fort Knox, Kentucky, is writing a special text on the topic (ST 23-91-1).

Burst simulation training needs little preparation, and requires no ammunition, no range, no special area. You can add some training aids, but no complicated equipment is needed. Burst simulation can be scaled to fit the area available.

The length of the training area and the maximum range in meters you want represented determine the scale and type of measurement to be used. You can use a tape measure, string, rope, engineer tape, or simply pace off the ranges.

Assign a member of the support squad, preferably the ammo bearer, as the pacer and burst mover. Have him pace off the distance from the mortar position to the end of the training area. This represents your maximum range.

For example:

Dividing, we find:

20 paces = 1,000 meters
2 paces = 100 meters
1 pace = 50 meters

This scale is used by the forward observer in determining range from his position and by the burst mover in determining the range of each round from the mortar position.

Establish the forward observer's position approximately 20 paces (1,000 meters) to the right front of the mortar position and have the gunner place his aiming posts out of the target area, to the left.

Place numbered range markers out every 20 paces (1,000 meters) from the forward observer's position into the "impact" area. The targets can be boxes, cans, or actual scaled models. The burst can be represented by a ball of paper, a rag, a cotton ball, or the like.

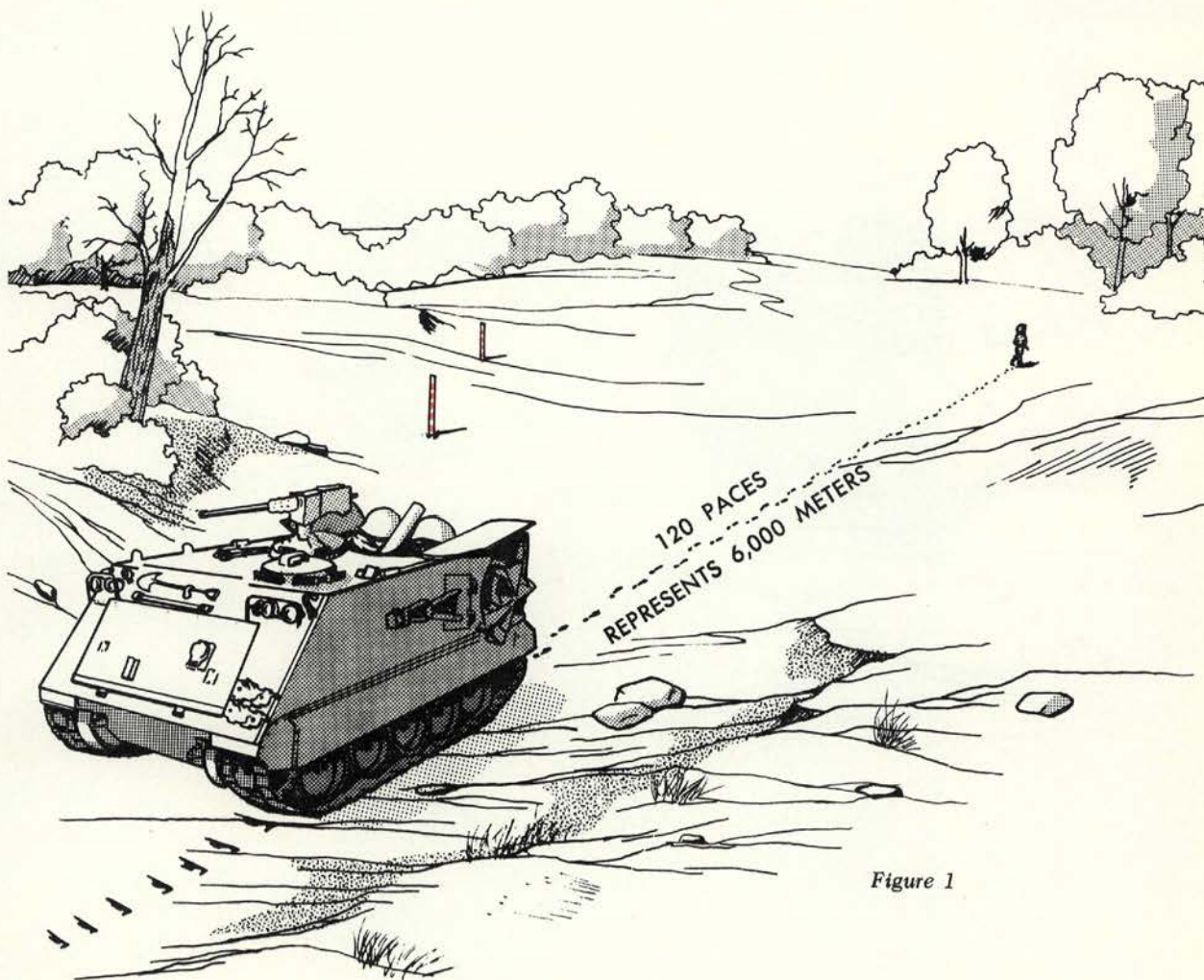


Figure 1

Note. The mortar sight should be boresighted and the mortar laid on an actual mounting azimuth.

Note. The forward observers will use the mil reticle in their binoculars or the finger and hand method to determine mil angles.

The forward observer radios his call for fire to the support squad.

The first round is fired (fig 2) marking center of sector, 2,000 meters from the mortar position. This and the observer target direction is plotted on the plotting board. The 2,000 meters = 40 paces. The gunner sets the deflection announced in the fire command, lays on the aiming posts, then refers the deflection to 3,200 mils (which is boresighted aligned with the mortar barrel).

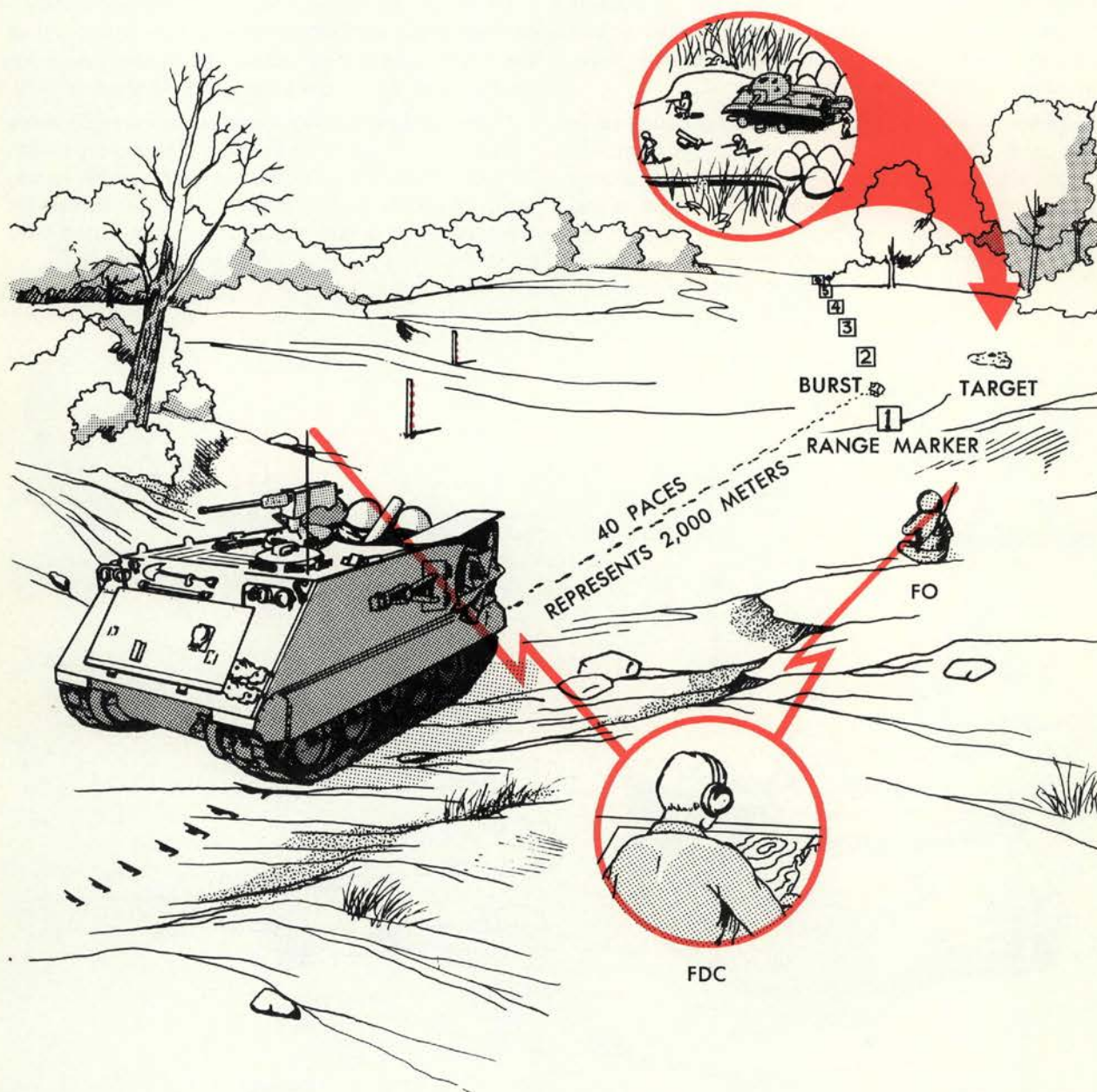


Figure 2

The burst mover paces out 40 paces from the mortar position and is aligned by the gunner (using arm and hand signals) on the vertical line of the sight reticle.

Using the range markers, the forward observer estimates the range to the target to be 2,000 meters. He spots the burst as short and 100 mils left. His correction would be RIGHT 200—ADD 800. He

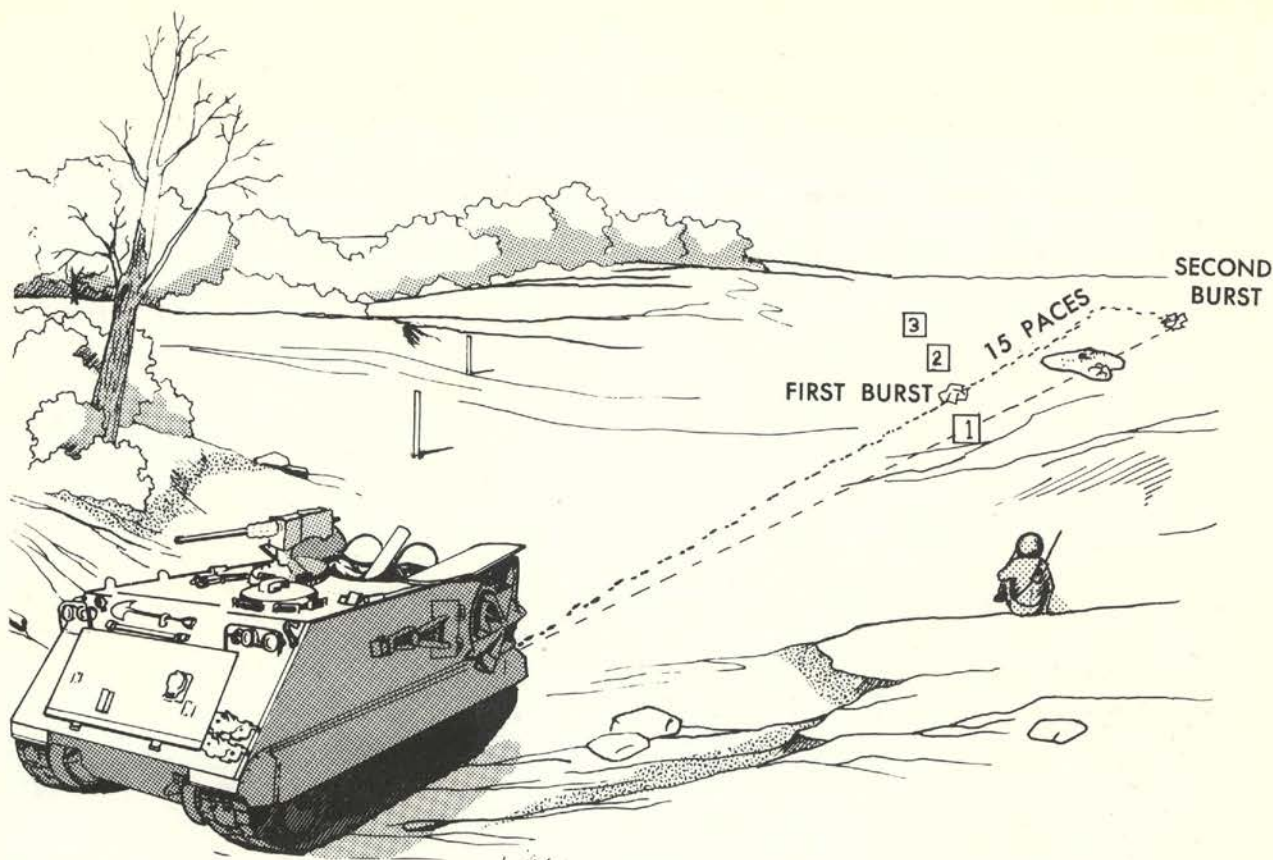


Figure 3

calls this subsequent correction to the support squad. It is plotted and the corrections given to the gunner. The gunner re-lays on the aiming posts, then refers the sight to 3,200 mils. The range of the second round from the mortar position is 2,750 meters (750 meters or 15 paces beyond the first burst). Starting at the first burst, the burst mover paces away from the mortar position (not from the forward observer's position) 15 paces and is realigned by the gunner (fig 3).

Using the proper forward observer procedures, shift on target and establish this target as a known point. Then continue shifting to other targets. The burst simulation method can be used on a table top, on the floor, or outside. It can be scaled for map training, so that coordinates can be used.

DISCUSSION

Burst simulation does not provide all the training that live fire gives such as preparing charges, firing the round, range estimation, etc. It will, however, train and test the support squad in mortar gunnery and fire direction procedures, and the members of the armored cavalry platoon in forward observer procedures. Any indirect-fire team can use this method. With imagination, burst simulation training can be used in many ways, under different situations, and in combination with other types of training. The USAARMS special text (ST 23-91-1) will explain different ways to use this method, and lists other training aids that can be made and used by TOE units.

SUSPICION CONFIRMED

The staff of the Armor Association spends a great deal of time insuring that ARMOR Magazine gets to its subscribers. A computer contract has made the task somewhat easier than under the old system, but the print-outs have to be monitored daily. Recently the computer spit out a renewal notice to:

DEPT. OF THE ARMY
THE PENTAGON
WASHINGTON, D.C. 20310

In a few days the envelope returned in the mail stamped: "MOVED, LEFT NO ADDRESS."

ARMOR OFFICE BECOMES LANNEN HOUSE

On 5 February 1975, in conjunction with an Armor Association Executive Council meeting, the *ARMOR* Magazine offices were officially named Lannen House. Major General John K. Boles Jr. (USA-Retired), President of the Armor Association, and Fort Knox Commanding General, Major General Donn A. Starry, unveiled the plaque naming the offices for Sergeant John Lannen, a distinguished cavalryman of Troop G, 3d Cavalry.



General Boles and Major General James L. Moreland, Commanding General of the 49th Armored Division, flew in from Texas to preside over the Association's Executive Council meeting. A major topic of discussion was the postponement of the annual meeting and Armor Conference scheduled for May at Fort Hood (see page 58). Other business included expansion of the awards program, a financial analysis and projects to increase Association membership.

ARMY CAMOUFLAGE PAINTING

A new program of camouflage painting designed to improve survivability of Army equipment on the battlefield is underway.

Major items such as tactical wheeled vehicles and trailers, combat vehicles, field artillery, air defense weapons systems, and engineer combat and construction equipment will be painted in a four-color camouflage pattern. Aircraft will be included in the painting program when acceptable paints are developed.

The 12 camouflage colors being used in the multi-color patterns are related to geographic regions of the world. Changes in camouflage to approximate seasonal patterns in the woodland, desert and arctic

regions are at the discretion of major Army commanders.

Additionally, several changes have been instituted in the markings of vehicles. The white star that currently appears on the hood and sides of tactical vehicles is being removed.

Equipment identification markings will be limited to unit identification, national symbol and bridge classification. They are being stenciled in lusterless black camouflage paint on the front and rear of each major item of tactical equipment.

Changes to Army regulations, field manuals, and technical publications will specify which equipment requires camouflage paintings and will also contain instruction and pattern diagram. Items not specified may be camouflage-painted at the discretion of the Army commander.

14 ASSOCIATION MEMBERS SUBSCRIBE FOR 50 YEARS

In the November-December 1974 issue of *ARMOR* the editor mentioned that several readers have faithfully subscribed to their journal for over half-a-century. A review of Armor Association records in January this year revealed that 14 active and distinguished members have been receiving *ARMOR* for over 50 years. They are: US Army-Retired,

LTG Willis D. Crittenger
LTG Arthur J. Hanna
MG William S. Biddle
MG C. V. Bromley
MG Peter C. Hains III
MG Robert L. Howze
MG W. H. Nutter
MG James H. Phillips
COL Wendell Blanchard
COL S. Victor Constant
COL H. H. D. Heiberg
COL Charles G. Meeham
COL J. H. Stodter
Charles D. Young

PATTON MUSEUM'S PHASE II IS COMPLETED

Phase II of the Patton Museum of Cavalry and Armor four-phase construction program has been completed and dedication is tentatively scheduled for May 1975. The theme for Phase II is MOBILITY and will feature tanks from 50 years of Armor history plus Armor proponent helicopters. Information concerning dedication day will be furnished when a definite date is selected.



CPT William A. Paris



SP4 Dale Merrick

ARMOR AWARD WINNERS

The United States Armor Association's Executive Council voted during its May 1974 meeting to award two \$50 savings bonds annually for "the most innovative or stimulating" articles published in *ARMOR* Magazine. One award was to go to a company grade or warrant officer and the other was to go to an enlisted man or woman.

The winners of these awards were announced at the February Executive Council Meeting.

The top article written by a company grade officer, "A Visit With Old Bill," was authored by Captain William A. Paris and appeared in the January-February 1974 issue. Captain Paris was commissioned from Infantry OCS in 1966. He has served with Infantry, Armor, Air Cavalry, Armored Cavalry and with CDC — Armor Agency units. Captain Paris is currently assigned to the Student Detachment, Fort Benjamin Harrison, and is attending the University of Northern Colorado.

The article chosen as the best by an enlisted man, "Automotive Military Hardware," was authored by Specialist Four (then PFC) Dale Merrick and appeared in the March-April 1974 issue. Specialist Merrick holds a Bachelor of Mechanical Engineering degree from Cleveland State University. He is currently assigned to the 16th Engineers and is serving with the Directorate of Facilities and Engineers Nurnberg, USAREUR.

NEW COMBAT RADAR LOCATES ARTILLERY

A new combat radar system that can locate enemy artillery sites — sometimes even before the first shell hits the ground — is currently undergoing preliminary testing at the US Army Field Artillery Center at Fort Sill, Oklahoma. This Artillery Locating Radar (ALR) could be the answer to the Army's search for a fast, accurate and automatic

method of countering enemy artillery fire.

Technicians at Fort Sill have tracked incoming shells in flight and "back-plotted" the trajectories to determine the precise location of the firing weapon miles away, all automatically and within seconds.

The system will help equalize one of the combat soldier's oldest and greatest threats — being pinned down by high-volume fire from artillery he can't even see — by making the unseen weapons "electronically visible."

The ALR system uses a three-dimensional radar that electronically scans the horizon with a pencil-shaped beam moving so fast that it forms a sensitive electronic barrier over any sector of the radar's coverage.

The radar spots instantly any projectile rising through this beam-coverage curtain. It then tracks the shell and plots its trajectory. A small computer extrapolates this data and back-plots the trajectory to the firing weapon.

Two government contractors have developed versions of the radar system which is in the advanced development stage. They will compete in live-fire shoot-off tests which are scheduled through 1975. The winning radar will go into limited production after additional field trials.

CIVILIAN COMBAT SUPPORT STUDIED

The US Army Administration Center is conducting the Civilianization of Selected Combat Service Support Functions Study.

The purpose of the study, according to the Center's *ARMY ADMINISTRATOR* Magazine, is "to determine the feasibility, desirability, necessity, and methodology for using civilians to perform selected combat service support functions in a theater of operations during a military conflict."

LEADERSHIP MANAGEMENT COURSE TO START AT FORT HARRISON

An innovative new management course could be offered Army-wide at installations and service schools.

The 40-hour Leadership and Management Development Course (LMDC), originally developed at Fort Ord and now taught at Fort Jackson, will be started by the Institute of Administration at Fort Benjamin Harrison, Indiana.

The innovative twist comes in the transfer and application of selected small group learning methods from civilian management to the military sphere.

If successful at the Institute, the LMDC may be extended Army-wide. □

1975 Armor Conference

Postponed

The 1975 annual Armor Conference and the 86th meeting of the United States Armor Association, scheduled at Fort Hood, Texas in May has been postponed until September 1975.

Postponement of the conference from May 21-23 until September was made because of funding and fuel limitations. New dates for the conference will be announced later as plans become more firm.

Major General John K. Boles Jr. (USA-Retired), Armor Association President, expressed the hope that the postponement will not discourage individuals who plan to attend the meeting and conference, since the intention of the event is to be "stimulating and professionally rewarding."

When held, the theme will be "Combined Arms Team — Today's Army Division." Both social and professional activities are scheduled. Included are plans for equipment displays, seminars, a field training exercise and a banquet.

This year's location at Fort Hood is an ideal choice for the theme. Two armored divisions — the 1st Cavalry Division and the 2d Armored Division — are based on the installation. The 49th Armored Division of the Texas National Guard also has many units stationed near Fort Hood and frequently conducts training there. Armor has long been associated with Fort Hood history starting in its early years as the home of the Army Tank Destroyer Center.



THE TWO BATTLES OF THE LITTLE BIG HORN AND THE BENTEN-GOLDIN LETTERS ON CUSTER AND HIS LAST BATTLE

by John M. Carroll. Liveright. 214 and 312 pages. 1974. \$35.00 each. Limited edition (1,000 each).

As long as there are military buffs there will probably be Custerphiles and Custerphobes. While Gettysburg may be the most studied American battle, the Little Big Horn affair is undoubtedly the most controversial and disputed. None of the Americans with Custer survived to explain what, how or why; and those in the second battle referred to in the title (those with Major Reno and Captain Benteen) gave such contradictory testimony both in subsequent inquiries and in later years that no one will ever be sure of the true course of events. Even the Indian accounts conflict, both with the American versions and with each other.

For this reason, one of the most eminent authorities, Colonel W. A. Graham, decided 20 years ago to try to sort out all the controversy. And he had probably the best credentials to do it; he had written three authoritative works on the battle and was the author-compiler of *The Official Record of the Reno Court of Inquiry*. In 1953 he published his comprehensive book, *The Custer Myth: A Source Book of Custeriana*, not to put the controversy to rest but to guide those who might wish to reconstruct their own mosaic of history. Knowing that good historical arguments never die, however, he wrote with tongue in cheek, "To those persons who think that Dissolution of the Custer Myth is easy, and particularly to those who are quite sure they have Dissolved it, This work is dedicated: (with malice aforethought, express and implied)!"

The literary world has been fairly quiet about Custer since then. But now John Carroll, a renowned Custerphile, has stirred up the pot again with the publication of these two limited edition volumes. Fine books, handsomely done, albeit quite expensive. For the Custer buff, though, they are first-rate.

In the first volume, Carroll has reproduced the most contentious, dis-

puted and disruptive of all Custer items, General (then Captain) E. S. Godfrey's famous article, "General George A. Custer and The Battle of The Little Big Horn," originally published in *Century Magazine* in January 1892. Godfrey commanded Troop K of the 7th, fought with Major Reno's battalion, and was thus able to speak with some authority.

This article's reception created such a furor (it was particularly damaging to Reno and Benteen) that it was rewritten by General Godfrey with added material and republished in 1908 and then again in 1921 on the 45th anniversary of the battle. The significance of the present publication is that it gives us both the revised manuscript plus Godfrey's previously unpublished handwritten corrections and marginal annotations. It doesn't add any remarkable insights nor will it change any history, but it does add more detail and exactness to earlier accounts.

Other letters of historical significance included here are those of General Charles F. Roe, 2d Cavalry who was present at the discovery of the massacre and participated in both the original burial and the later reburial.

The second volume is devoted to the mystery man of the Little Big Horn, Theodore Goldin, and his long, extensive correspondence with Benteen. Goldin was a youthful runaway, a recruit of less than three months service at the battle, who was discharged without honor in November 1877 because of minority enlistment, but who traded on this experience 19 years later to acquire himself a Medal of Honor and an honorary colonelcy in the Wisconsin National Guard! Benteen was a bitter, brooding man who despised Custer and felt the world had slandered and reviled him, denying him the honor that should have been his due. They made a strange pair of correspondents.

Carroll feels that Graham treated these two too generously and that, if historical veracity is to be maintained, their letters should be published in their entirety, illustrating all their partiality, vituperation and self-adulation. Carroll's view is that too many character assassins have accomplished their deeds on flimsy substantiation and that it's past time to show these so-called "historical truths" for what they really are. Again, no great sur-

prises, but interesting revelations and insights.

Carroll remarks in his introduction that these letters "will lay to rest all those arguments, then, now, and in the future" about various aspects of the Little Big Horn affair. Hardly! If nothing else does, Carroll's resurrecting the allegation that Reno proposed abandoning the wounded and dismounted troops in order to escape should start the waves again. The controversy will never cease. But then maybe that was really Carroll's intention in presenting these new facts for he ends his introduction saying: "Rather than closing the door, however, they do open new ones. But isn't that half the fun of being a Custerphile?"

Colonel John R. Byers
Chief, OPD-AR

THE SOVIET PRESENCE IN LATIN AMERICA

by James D. Theberge. Crane, Russak and Company, Inc. 107 pages. 1974. \$4.95.

Theberge's book, part of the National Strategy Information Center strategy paper series, provides a compact overview of Soviet relations with Latin America, highlighting Soviet objectives for the area and policies for achieving these goals.

The Soviet objectives identified by the author offer no surprise. The Soviets seek to strengthen their position in Latin America and weaken US influence without risking a military confrontation. The defense of Cuba is a third Soviet aim. The fall of Allende in Chile, lack of unity among communist parties and improving government control over insurgency seem to signal setbacks for the Soviets in Latin America. The author suggests, however, that the Soviet position in Latin America is stronger today than in the past, although Soviet dominance in the area is unlikely.

The Soviets are emphasizing the use of legal means to gain influence in Latin America. The favored foreign policy tools today are diplomacy, economic assistance, military aid, propaganda, espionage and subversion. Efforts are being made to exploit nationalistic tendencies, especially where

anti-US sentiment is high. Theberge asserts that the Soviets are taking special care to conceal their lessening support for revolutionary violence.

Theberge's discussion is well balanced. He acknowledges that many factors will tend to inhibit Soviet success in Latin America. As long as the current US-Soviet detente relationship exists, the Soviets are likely to employ techniques which prevent a serious contest with the United States. Such an approach would be in keeping with the shifts between expansion and coexistence which have characterized Soviet foreign policy over the years. Further, the Soviets have found that Latin American nationalism is a two-edged sword; they, too, are vulnerable to nationalistic assaults. The self-interests of Latin American states are likely to prevent domination by any external faction.

The Soviet Presence in Latin America is a well organized monograph. The book should find wide appeal among readers of international affairs and strategy, particularly those with special interests in Latin America and the Soviet Union.

William M. Stokes III
Lieutenant Colonel (P), Armor

PATTON PAPERS 1940-1945

by Martin Blumenson. Houghton Mifflin Company. Boston. 889 pages. 1974. \$20.00.

The Patton Papers 1940-1945 is the story of George S. Patton Jr. and how he discharged his responsibilities as a general during World War II. The accomplishments of his forces, about which so much has already been written, were not included in this book. The author, Martin Blumenson, has done a brilliant job of organizing letters, documents and diary entries in such a manner that General Patton tells his own story. The story is inspiring and reveals a man who was never really understood. The book leaves no doubt that he was arrogant and egotistical. But is it really bragging when a person produces the results: "May God have mercy on our enemies; they will need it."

The story points out, had he been more diplomatic he would have probably gotten five stars similar to many of the younger contemporary generals who passed him in grade and rank. But General Patton earned more — his fame as an invincible winner on the battlefield is legendary. His attitude is best expressed by his actions

following the Knutsford incident in England when General Eisenhower was considering returning him to the United States and reducing him from lieutenant general to colonel. General Patton understood the reduction but demanded the rights as a colonel in the Army to lead an assault regiment in the forthcoming Normandy invasions.

General Patton's writing reveals contempt for those contemporary generals who had never seen war. He was a strong believer in destiny, God and the Anglo-Saxon way of law. "Wars are won by people who get out and do things." He believed "the American soldier . . . is a peerless fighting man" and strongly held the belief that the United States must win not as an ally but rather as a conqueror.

The letters and statements of his troops show him to be "uncompromising but understanding;" a commander who led in person and never lost touch with the front line soldier, a fighter who had an obsession to attack. General Patton drove his subordinates to greatness and he firmly believed that "a commander who failed to achieve his objectives and was not dead or severely wounded had not done his full duty." "Patton whooped with joy every time they ran off a map and had to use the next in series." "We have always gotten to each defensive line, not through my efforts but through the glory of God, three days before the Germans thought we would."

The book explains why everyone had confidence in his ability as a general. To the British, he was their favorite US general. The Germans felt he was the best allied general and probably gave him more recognition than his own country. The Germans felt he would command an Army Group which he never did; but his mythical Army Group kept the German 15th Army at Calais long enough for the Normandy landing to be successful.

A captured Italian officer said "Americans were strange people; they attacked all day, marched all night and fired all the time." This was because of Patton's philosophy that "Our mortars and artillery are superb weapons when they are firing. When silent they are junk — see that they fire;" "When in doubt — attack;" "God favors the bold, victory is to the audacious;" "Work like hell and trust in destiny;" "Some people call it luck, some genius. I call it determination." As summed up by his West Point roommate, "Few men of our time have

seen so much, done so much and for such a length of time occupied the headlines of every paper and magazine in this broad land."

Lieutenant Colonel Carl M. Putnam
HQ FORSCOM

BY VALOR AND ARMS: THE JOURNAL OF AMERICAN MILITARY HISTORY

Michael J. Koury, Publisher. Fort Collins, Co. Valor and Arms Press. October 1974, Vol. I, No. 1. \$8.50 per year. Published quarterly.

Military history buffs will rejoice at this newcomer to the field, a journal dedicated totally to this special subject. And, if future issues turn out as well as the first one did, readers will be well rewarded for their investment.

In his introduction, the publisher notes that present plans call for the journal to emphasize pre-World War I history since other publications adequately cover more recent times. His purpose is to create a journal that appeals to both the scholar and the occasional reader by including items of varying interests such as reprints from early military publications for on-the-scene descriptions, plus new articles by leading historians for different perspectives. One section will feature military art, and this initial issue has a fine article on Lorence Bjorklund, the distinguished illustrator of the US Cavalry and the Plains Indians.

This first issue is devoted exclusively to Custer, surely the most over-worked subject in US military history. But it's well done. There's a reprinted article by Custer on his Yellowstone campaign, a detailed chronicle of his Civil War exploits, an intriguing piece of extrasensory writings alluding to Custer, an 1896 reprint of General Gartington's history of the 7th Cavalry, a rare reprint of a soldier's memories of an 1873 surveying expedition led by Custer and an interesting article on Medal of Honor couriers.

Future issues will be more diverse, including such subjects as the US Marines on China duty, the Model T in war, reprints of the old regimental histories and a comprehensive book review section. *By Valor and Arms* promises to be a welcome and valuable addition to the military reader's bookshelf, and appears to be well worth its cost.

Colonel John R. Byers
Chief, OPD-AR

ARMOR *the Magazine of Mobile Warfare*

U.S. ARMY ARMOR SCHOOL



Post Office Box O, Fort Knox, Kentucky 40121

FROM THE EDITOR

"If I write an article for ARMOR, what are the chances that it will be accepted for publication?"

It is obvious that this is a difficult question to answer diplomatically, especially if it hasn't been written and I haven't read it. *ARMOR* is always in need of good articles. Any individual who has an idea or conviction and puts a little rational thinking and literary effect behind his pen is going to come forth with a good paper. Some of the better articles are solicited because I am acquainted with many people who specialize in a specific field. It is my policy to clean up only, not rewrite. Style often becomes an author's trademark.

Our journal has published hundreds of articles and essays that have received wide acclaim. Many have been reprinted in military journals worldwide and numerous have been mentioned in research papers and newspapers, to include *Army Times*.

Many of *ARMOR's* foresighted authors have been accused of being "unrealistic," but time has been a witness to their correct theses.

If you think tanks should have ejection seats for the crew; or that some armor units are improperly organized; that some point in military history needs more analysis; that our field uniform is impractical or that armor as a combat arm has not recognized the potential of the helicopter, write about it. There is a host of subjects that needs to be addressed, and there is a large readership waiting to digest it all. With the November-December 1974 issue, the Armor Association began forwarding to all published authors an 11" x 14" full color certificate with the Association crest and proper credits for their professional contribution.

I attempted to get a feature entitled "Profile of a Professional" off the ground, but contributions totaled exactly one.

I feel that we could also use some items under "Professional Thoughts," two or three hundred word unclassified essays on anything except personalities or politics. The US Naval Institute's publication *Proceedings* has used this technique for years.

Most of our readers enjoy letters to the editor. I do, too. Now that *ARMOR* has an AUTOVON number, we are at a disadvantage. I don't mind the calls, but please put your comments on articles and departments also in a letter, so we can share your pros and cons with others. It is my objective to have our readers look forward to each new issue of *ARMOR*.

In 1974 we received about 80 articles, of which 60 were excellent and accepted. Forty eight of these were published; therefore, to answer the topic question, an article has a 75 per cent chance of being accepted for publication.

A reminder — please send in your reader surveys from the January-February issue.

A handwritten signature in black ink, likely of the editor, is written diagonally across the bottom right of the page.

Mar-Apr



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ARMOR

may-june 1975



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"To disseminate knowledge of the military arts and sciences, with special attention to mobility in ground warfare; to promote professional improvement of the Armor Community; and to preserve and foster the spirit, the traditions and the solidarity of Armor in the Army of the United States."

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Cover

The seal of the Patton Museum. Beginning on page 16, the director of the museum discusses its mission and function within the Army museum system, the background and future development plans for the museum, and the collection and recognition of historic Fort Knox from World War I to the present. (Design by Richard M. Crossett, Louisville, KY)

"Old Bill"

Dear Sir:

Why is "Old Bill" in every issue of *ARMOR*? Who was he?

WILLIAM T. ANDERSON

Second Lieutenant, Armor

Fort Lewis, Washington 98433

"Old Bill" may have been a horse as we know who the rider was.

The following are the words of Lieutenant Colonel F. H. Hardie, former commander of Troop G, 3rd Cavalry Regiment. In 1911 he wrote in the *Cavalry Journal*:

"John Lannen was born in Canada in 1845. He came to this country while in his teens. He enlisted in 1870 in the 4th Cavalry and served five years in that regiment. He reenlisted in 1875 in the 3d Cavalry and thereafter served in the 3d, Troops "F", "B" and "G", with the exception of a short tour on recruiting duty.

"Sergeant Lannen was in the B Troop, 3d Cavalry when I joined in '76. He came to my troop after I got my captaincy. He was a strikingly handsome soldier, a gallant man and a non-commissioned officer of the old fashioned kind, those whose orders were always obeyed.

"At Tampa in 1898 Frederic Remington, with whom I was quite intimate, at once noted the ease and grace with which Sergeant Lannen rode and selected him as the most perfect type of the American Cavalryman he had ever seen and he made several sketches of him, one of which has very wisely been selected by the Cavalry Association as its copyrighted symbol. At this time Sergeant Lannen's hair and mustache were white. He had blue eyes and a dark, ruddy complexion. He was a superb horseman, carrying himself with remarkable ease and grace. His horse was his friend and comrade.

"Aside from his horsemanship Sergeant Lannen's most marked characteristics were his loyalty to his organization and his unfailing good humor under trying conditions. Ordinarily a stern disciplinarian, he was always ready with a smile and a jest when roads were muddy, skins damp and cold, and rations low. He accepted hardships as part of his day's work.

"There are too few of his kind. He was the epitome of a soldier and cavalryman.

"With almost thirty years of faithful service and preparing for retirement,

Sergeant Lannen died suddenly of yellow fever at Santiago in late 1898."

We shall continue to proudly display "Old Bill" as a symbol of all mounted combat soldiers.

—Ed.

60 Minutes Response

Dear Sir:

Recently I watched the TV program *60 Minutes* deliver a scathing critique of the Army tank program, especially the actions that produced the *M60A2*. The themes are familiar ones; gross mismanagement, horrifying waste, stockpiling equipment that is inoperative, which will require extensive and expensive modifications, and bungling of all descriptions, including an attempt by top level Army "brass" to cover up their shocking mistakes. I discussed this program in my business policy classes at the University of Texas at Austin as an interesting case of top level decision-making. One of my several purposes was to stimulate a response to such questions as: *Did this program facilitate constructive analysis of the situation as presented, or did it impede it? Was the primary appeal to logic, or emotion? Could you — say as a Congressman — make a sound decision based on this program? What were the objectives of those who prepared it?*

At the outset of my classes I told my students that the name of the game is to engage the brain. How many actually will do this will be a continuing test of both my students and myself. Basically, I am trying to develop a realistic appreciation of the decision-making process, with emphasis on the nature of the environment, objectives, courses of action and consequences (with due respect to time and resources).

This particular TV program provided an excellent opportunity to explore some of these decision-making facets. Most student declared that they needed more facts before reaching a conclusion — a hopeful sign, but there was no doubt that they were concerned about the ability of the tank to survive against increasingly powerful and sophisticated missiles, and especially those delivered by helicopters from great distances. A few students declared that the Army was wasting the taxpayers' money on a terribly expensive weapon that had only a slight prospect of survival on the modern battlefield.

The nature of the course precludes further examination and discussion of this issue, but I hope that I have created a desire for reasoned analysis and a resistance to being stampeded into a decision on any matter. What prompted this letter was the receipt of the January-February 1975 issue of *ARMOR*, and the editorial on tank design philosophy, the note on *M60A2* training, and Lieutenant Colonel Ebert's article, "The *M60A2* in Perspective."

Regarding Colonel Ebert's third paragraph — I recommended he refer to the article "Are We Flogging A Dead Horse?" in the November-December 1973 issue of *ARMOR* if he missed it.

DR. GEORGE G. EDDY

Colonel, USA-Retired

Austin, Texas 78746

Dear Sir:

CBS' recent *60 Minutes* broadcast, hosted by commentator Mike Wallace, stemmed conversation on the controversial tank program, as they put it. The first report explained the development of the tank during World War I, and how they were "clanking curiosities." By World War II they were a serious threat to modern day warfare. They went on to interview heads of armored operations at the Armor School and other places.

It was stated that the US Armored Forces face a serious numerical disadvantage. After explaining the technical difficulties involved with the crash *M60A2* program, the reporter (Mr. Wallace) in his own way, without actually saying it, but getting the point across, explained foul-ups and denounced the Army.

It was up to the US Army to develop a missile firing tank, because of the threat of the Russians developing such a vehicle.

During 1969, due to operational difficulties, the Army was spending more money than they should have and here again, *60 Minutes* jumped down the Army's throat.

Another chapter of the story was facing the Main Battle Tank against TOW mounted on helicopters. A helicopter's odds of knocking out a tank are good alone; however, *60 Minutes* again did not show a fair example of how the MBT, when used in combined arms with artillery, antiaircraft and infantry forces, is very successful as a combat vehicle.

It is this writer's opinion that CBS' 60 Minutes program just wanted to show that the American Army wasted the taxpayers' money with unnecessary expenditures that are easily destroyed. HOGWASH!

- There was no mention of the fact that US tank crews are qualified and competent.

- Combined arms duels are very successful on the part of the tank.

- They fail to make mention of the fact that when the US produces tanks, it provides jobs and strengthens the economy.

It is this writer's express opinion that such a narrow-minded attitude on the part of 60 Minutes is not in the true spirit and tradition of the American way that brought freedom and security against all opposition.

RALPH CROCE
Flushing, New York 11354

"M60A2 In Perspective"

Dear Sir:

The purpose of Lieutenant Colonel Ebert's article on the M60A2 in the January-February 1975 issue was to place this weapon's system in perspective for future users, but his thoughts have a much wider application. The first paragraph of his message is extremely important and is worth repeating:

"For a good number of years, the M60A2 concept and the tank itself have been examined, tested, retested, discussed and cussed. The latest (and last?) test of the tank has recently been completed and some 400 will be placed in our operational inventory in the near term. The time for hashing over the concept of this particular tank has ended. Likewise, the time has ended for speculations about its maintainability, 'troop acceptance' and relative effectiveness. The time has arrived for accepting the M60A2 into our formations and applying ourselves toward its most effective and efficient utilization."

For the "M60A2", you can substitute any weapon or other item of equipment that is placed in an operational status. Certainly we want to progressively upgrade our armament and accouterments, and there are established ways of getting input in this regard from the field, but we should never confuse what may be in the future for what we have right now.

If we learn nothing else from the Israelis' experience, we must realize that competence of the operators is at least as important as material capabilities and probably more so. Weak and inexperienced commanders will try to

obscure their shortcomings by spouting so-called shortcomings in their equipment. This only serves to detract from readiness. We should not hold still for it.

Forget about the news stories and Congressional critiques that dwell on sensationalism concerning cost overruns and failures to meet performance specifications. Forget about the differing opinions of the "experts". Even if changes are advisable (and many are not), they will not be made tomorrow.

Development of equipment is one phase and operation quite another. If you discover what you think is a problem (and have triple checked to make sure the problem isn't you), by all means report it, but also realize that you must develop a solution at the unit level for the short range (which could be six months to ten years or more).

In a unit, you have to be able to effectively fight or operate with what you have; what might have been or what may be will not help you at all.

You will seldom get such sound advice as was given by Colonel Ebert!

THOMAS G. QUINN
Colonel, Armor
Fort Knox, Kentucky 40121

Armored Vehicle Design

Dear Sir:

Reference your brief write-up on page 23 of the November-December 1974 issue of ARMOR Magazine, here's one "armored vehicle design buff" who will enjoy discussing the concept illustrated. First, I wish to clear up a few misconceptions for which I am uniquely qualified, inasmuch as it is my personal design submitted to ARMOR as an entry for the 1962 tank design contest. My entry won fifth place (it was considered a corporate entry, which it actually was not) for which I was awarded a two-year subscription to ARMOR and best of all, a free lunch on General Bruce C. Clarke.

At the time of the contest, I was the technical assistant to the manager of the Aerojet-General Ordnance Division at the Downey, California plant. Aerojet had declined invitations to participate in the contest. I entered on my own and did most of the work at home. When my boss found out what I was doing, he provided assistance in the form of publishing services and help with illustrations. Numerous associates provided suggestion and input, and I was also privileged to be allowed to visit the First Marine Tank Regiment at Camp Pendleton for a first-hand look at tank problems in the field.

My background included antiarmor

warhead research and design starting in 1950 at NOTS China Lake. The vehicle was conceived from an antiarmor designer's viewpoint, to provide maximum combat survival, maximum flexibility and heavy firepower. It mounted a 105mm howitzer, a 7.62mm coax machine gun, a twin 40mm high speed grenade launcher (in cupola), six Shillelaghs and a close-in apers projector battery. Two of the Shillelagh launch tubes can be seen immediately above the main tube. There were three tubes on each side of the turret, built into the spaced armor.

Over 200 copies of the 85-page "book" describing this concept were eventually distributed. At least 20 copies ended up at USATACOM having been sent there by various interested US Army officers and civilians.

DONALD R. KENNEDY
Senior Engineer
San Jose, California 95108

Reader Questions Findings of "Shopper's Guide"

Dear Sir:

I was particularly interested in Lieutenant Colonel Boehme's (ARMOR, January-February 1975) comparison of the ARSV vehicles since I served as the maintenance and recovery officer during the ARSV "user" test conducted at Fort Bliss in August 1974. Most of his remarks seemed to be based on the Fort Knox evaluation rather than on the Fort Bliss results which were based on a desert or Middle East-type environment.

All of the vehicles in the evaluation were compared against a baseline vehicle, the M113A1. Generally speaking, it is my opinion that the tracked vehicles were superior to the wheeled vehicles. While the XR311 did well according to Colonel Boehme in the Fort Knox test, I feel that its performance at Fort Bliss was less than impressive. Due to ignition failure and tire blowout the XR311 failed to complete any runs on the course.

The V150 Commando (follow-on to the XM706) and the XM808 suffered similar results due to tire malfunctions. Even though the XM808 had special tires and a sealant liquid installed, its performance was severely limited. This limitation was primarily due to a requirement for a wrecker to be used to change tires. The V150 suffered cracked motor mounts on its first run which was easily corrected, but it had the performance limitation of poor location of the observer in the vehicle which, in some cases, resulted in motion sickness.

Both the M113½ and the M113 Product Improved gave favorable im-

pressions during the test. Each vehicle had a high maintainability rate, good crew and storage areas, and a low breakdown rate. The *M113 Product Improved* turned in the best time on the course and would continually outdistance its chase vehicle and competition. Both vehicles had minor malfunctions which were easily corrected.

Surprisingly, the most consistent vehicle was the *M113A1*. During the entire test covering 20 runs on each course, the *M113A1* never broke down. It was for this reason that the *M113A1* was used as the chase vehicle for all of the others.

Upon completion of the test, I feel that the *M113A1* was undoubtedly the best vehicle entered in the evaluation and unsurpassed by any of the others. Even though the wheeled vehicles were quieter and faster, and the tracked vehicles had more passive night vision optics and weapons, as a cavalryman, I'll take a *113* anytime!

STEPHEN G. WHITWORTH

First Lieutenant, Armor
Fort Bliss, Texas 79916

German Attack Not Doomed From Start

Dear Sir:

I am writing in response to Captain Holder's article "Kursk: The Breaking of the Panzer Corps" (*ARMOR*, January-February 1975). I disagree with some of the captain's conclusions and, in general, I differ with most histories of the Battle of Kursk. I cannot agree to the conclusion that the German attack was doomed from its beginning.

The conditions which made for the Kursk battle were set by Manstein's counterattack early in 1943. It moved the Russians back, reestablished the front at about the same line where it was before the Stalingrad offensive and formed the outflanking salients of Kursk-Orel. These outflanking salients were so obvious that it would have been almost impossible for the next great battle on the Eastern Front not to have been fought there.

Both sides spent the next three to four months (from March to early July 1943) preparing for the coming battle. The Germans prepared for an all or nothing attack and the Russians a defense in depth with strong reserves for a counterattack once the German offensive was stopped. When this was done only the course of the battle itself would decide the final outcome. There were several pre-battle conditions which favored the Russians but which, I believe, were not in themselves decisive. The Russians had spies in the

German High Command, but these, at most, could only reinforce the obvious. Hitler postponed the start of the attack several times which gave the Russians more time to refine their already very strong defenses. The Russian partisans could harass German supply lines, but they could not greatly weaken or stop the German attack. The one greatest pre-battle condition which favored the Russians was, I believe, the selection of assault methods to be used by the Germans on the northern side of the Kursk salient. This method was to break the Russian lines by artillery and infantry attack and feed in the panzer divisions only after the Russian defenses had been split apart. This was far less successful than the total deployment of all German armor from the start of the attack as practiced on the southern side of the salient. But still I believe this was not finally decisive. The Germans had one advantage in their favor—Hitler did not try to run the tactical direction of this battle, thanks to Stalingrad.

On 4 to 5 July the Germans went into action. In the north they ground to a halt after gaining about seven miles. In the south the German attack crashed through the 6th Guard Army and drove six to eight miles into the Russian defenses. So great were the Russian losses that four of their reserve armies intended for the counter-offensive had to be prematurely introduced into the battle to keep the southern side of the salient from falling. Many of these reinforcements had entered the battle piecemeal and were chewed up almost instantly. By 12 July the Germans were ready for a decisive move. This move turned into a disaster.

The SS Panzer Corps of three divisions with 600 to 700 tanks ran head-on into the 5th Guard Tank Army with 850 *T34s*, *KVs* and assault guns. They met north of Prohorovka between a rail line and the Psel River. It is impossible for me to believe that the Germans planned to fight a battle in this manner. They gave away their two major armor advantages. With their 75 and 88mm cannons they could pierce Russian tanks at any battlefield range while the armor of their own tanks could be pierced from the front only at point-blank range by the 76.2mm cannon of the *T34s* and *KVs*. The Germans blundered and lost both these advantages. They also lost about 350 tanks and, I believe, their last chance for at least a standoff on the Eastern Front. The Germans lost by a mistake or error they never should have made and so went the war.

That this battle near Prohorovka had to be the way it turned is to me very

doubtful. The history of war is filled with instances where only pure chance decided the results of an important battle. How many times were masses of hard-charging *T34s*, *KVs* and *Stalins* out-thought, out-maneuvered, ambushed and massacred by small numbers of *Panthers*, *Tigers* or assault guns? At Prohorovka the numbers were not greatly different; a flanking movement or a well-laid ambush could have destroyed the 5th Guard Tank as an effective fighting force. Following this the SS Panzer Corps would have joined with the 3d Panzer Corps coming up from the south. They would then cut behind those Russian units resisting the advance of the 48th Panzer Corps and would have destroyed them. Past the Psel River, past Oboyan, past Kursk, north into the rear of those Russian units holding off the German 9th Army.

The Kursk salient would have fallen with a bag of loot and prisoners bigger than the Ukraine in September 1941 or before Moscow in October of the same year. The whole risky plan would have paid off and the Stalingrad disaster would have been reversed. The Germans would have had almost one year to ravage the Red Army in open mobile warfare under commanders such as Manstein, Hoth and Hauser. At the same time I believe the Germans could at least have held the allies to a very slow pace up the Italian boot. The D-Day landing could have been far different.

That history would have gone this way is by no means certain, but that it would have been different seems to me to be beyond doubt if the Germans had not blundered at Prohorovka.

DWIGHT A. NEWSOM
Lubbock, Texas 79407

Antiaircraft Cannon System

Dear Sir:

Colonel John P. Berres' article in the January-February 1975 issue was a fine discussion of the current need for a fully-protected, long-range, antiaircraft cannon system. Mentioned only in passing, but deserving much greater emphasis, is the continued availability of the *M48A3/M60* automotive package as a viable mobility platform well into the foreseeable future. Existing *M48/M60* hulls provide adequate ballistic protection and when retrofitted with the latest model *AVDS 1790* engine and 500 amp alternator will be able to maintain the tempo of even the fastest-paced battle, and meet the electrical demands imposed by the radar and other components associated with the antiaircraft

cannon system. An additional benefit gained is that all repair parts are standard items readily available in the supply system. The *M48A3/M60* chassis represents a least cost solution for the mobility platform for this and other systems designed to support forward combat elements.

Unfortunately, while Colonel Berres' proposal merits serious consideration for utilization of available assets, the Army's immediate requirement to increase and upgrade its tank inventory in the face of heavy arms sales takes priority. A vehicle shortage must be made up and the several thousand obsolescent tanks need to be rebuilt to meet current operational requirements. The decision to rebuild *M48A2* and *A3* tanks is testimony to the high priority given to upgrading the tank inventory and verifies my position that the *M48/M60* chassis will continue to be a serviceable component providing satisfactory protection, mobility and maintainability. Perhaps in three to five years as the rebuild program and increased *M60A1* production bring our inventory to authorized levels, we can turn our attention to a new (or half-new) system.

We can project that *XM-1* production models will be coming into the active inventory within five years. As these vehicles replace older *M60A1s* and *M60s* in the reserves, the chassis made available by this displacement could be retrofitted with a fully-protected, anti-aircraft cannon system. These would be reissued to deployed armor units. In order to make deployment of *XM-1* and the new system relatively concurrent we must begin, at once, to develop the new turret and associated components. Perhaps the congressional budget managers will recognize the effort to reduce system procurement costs by effective utilization of available assets, thereby increasing our chances of authorization for procurement of a badly needed addition to the inventory.

Regardless of whether we eventually mount Colonel Berres' proposed weapon system on an *M48/M60* chassis, it is good to know that he has not lost sight of those old hulls. The difficulty the Army is currently experiencing procuring additional hull castings should bring home to even the most skeptical the continuing value of these assets.

JAMES ETCHECHURY

Captain, Armor

Fort Knox, Kentucky 40121

More on Tank Gunnery

Dear Sir:

I am relatively young to the Armor scene, having been in the Army only

two-and-a-half years. However, after two TCQCs at Fort Hood, I must agree that our program is anything but based on "real" battle situations. I agree with most of Lieutenant Colonel Bahnsen's ideas, ("Our Tank Gunnery Needs a Revival" *ARMOR*, September-October 1974), and would like to add a point to his night firing course.

A section of tanks would go down range together. On each target, one tank must use the searchlight to locate the target while the other is the firing tank. Both tanks should be graded on their ability to properly use a searchlight. Such points as speed of target acquisition, time of illumination, proper positioning and technique would be starting points for grading. The tanks should move together, therefore Colonel Bahnsen's section concept could easily be integrated with this program.

I am very interested in improving our tank gunnery program and would like to say to Colonel Bahnsen that the junior officers here at Fort Hood would like to see some of his ideas in action. Maybe we could even help some.

A. M. McCAIG JR.

First Lieutenant, Armor
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More on "Shopper's Guide"

Dear Sir:

I found Lieutenant Colonel Boehme's contribution to *ARMOR* (January-February 1975) entitled "Shoppers Guide to Recon Vehicles" informative but somewhat disheartening! As stated, the purpose of the article was to bring the reader up-to-date on the various models of reconnaissance vehicles that have been and are being service tested by the US Army. The general characteristics and simplified test results of the four vehicles mentioned in his article were presented clearly and convinced me that the one vehicle that should be adopted Army-wide to fill this C & R void we're living with is the *M113A1* (briefly mentioned in Colonel Boehme's article as a comparison vehicle).

It's been discouraging being stationed in Germany for four years and watching the reliability, availability and maintainability of our current recon vehicle (the *M114A1E1*) slowly but surely deteriorate while an already combat and RAM proven vehicle, which is the logical successor vehicle to the *M114A1E1*, is virtually ignored. An *M113A1* properly outfitted with adequate firepower (an interesting problem in itself) and manned by a well-trained crew would more than fill this void that exists in the C & R role. We've been

carrying the *M114* for years on the chance that it just might blossom, but I'm sure most of us know it'll never live up to its expectation. A quick and reliable replacement has been needed for a long time in Europe and my vote is for the *M113A1*!

I only wish Colonel Boehme had compared the *M113A1* in a C & R role to the other four vehicles he mentioned, for I'm sure we could save a lot of time and energy by taking a harder and closer look at it!

JOHN R. BAER

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TC 17-15-3 (Draft) Questioned

Dear Sir:

I wish to take issue with a few points brought out in *TC 17-15-3* (Draft). Specifically, I disagree with the draft's make-up of tank sections, the importance of speed-versus-accuracy of fires and ranges at which targets can be engaged.

As a tank platoon leader, I found it not only more convenient but imperative that I remain unattached to any specific section.

If a platoon leader becomes so involved in leading his section, he will invariably lose some efficiency in running the platoon. The platoon leader should be where he can best control his unit — independent of either section yet in contact with both. I found this to be the easiest means of staying in contact with both sections.

Secondly, the statement that firing first is more important than accuracy is ridiculous. To fire first and miss would do absolutely no good. I contend that accuracy and speed are of equal importance in a tank or antitank duel.

The third general fallacy I would like to correct is that anything that can be seen can NOT be hit in an open or desert environment. The distances that can be covered by unmagnified observation in such areas are often deceiving. The illusion of closeness could produce disastrous consequences if an attacking or defending force gave away its position prematurely by opening fire too soon.

I am glad *TC 17-15-3* is only a draft at the present. I would hope that literature sent to our younger tankers would be more researched and precise in the future so that misinterpretation and misrepresentation will not occur again.

ALBERT M. McCAIG JR.

First Lieutenant, Armor
Fort Hood, Texas 76546 □



THE COMMANDER'S HATCH

MG DONN A. STARRY
Commandant
US Army Armor School

THE FIRST BATTLE OF THE NEXT WAR

The United States is currently in the midst of a difficult reassessment of its position in the world. Related to that assessment is the question of how big a military establishment we should maintain. While this phenomenon occurs after every war, the debate today is perhaps more vocal and acrimonious than in times past, and its questions in some ways more difficult to answer. There are those who question why we need an army at all; others accept the need but would argue widely divergent views about how much money, men and materiel we should provide for our Armed Forces.

Look back for a moment. Twenty-five years ago the United States was recovering from World War II. The active Army stood at 600,000 men in ten divisions. Then, as now, there was debate about its purpose, size and shape. The debate was cut short by war in Korea, and we did not return to it for over four years. When it resumed, the Army stood at 19 divisions, its strength was just short of a million-and-a-half men. Despite some domestic dissatisfaction with the conduct and outcome of the Korean War, we were clearly the most powerful nation on earth. We enjoyed a virtual monopoly of nuclear weapons systems. The economy was stable. We had a large, strong military establishment which had just demonstrated its tremendous ability in a war against the Chinese and North Koreans.

Now we find ourselves in quite a different circumstance. The war we have just fought is over. The economy is in trouble and no one seems to have a ready remedy for its ills that does not produce results unpopular with vocal minorities in public life and in the media.

With 13 divisions and 785,000 men, the Army is the smallest it has been since June of 1950. The system of alliances around the periphery of the communist world empire so carefully contrived by Eisenhower and Foster Dulles is weakened, some say crumbling. Perhaps even crumbled. Our great power adversaries, while less intransigent in some ways than before, can afford that luxury — they are clearly stronger than they have been at any time since the close of World War II. We are a nation beset with many ills which make the familiar questions more difficult, if not impossible, to answer in the same old way.

Why do we need an Army anyway? A typical question from the growing liberal membership of Congress.

What should we be training the soldiers to do? A typical question from a lieutenant in a training center.

What will the next battlefield look like? A typical question from a service school instructor trying to decide what to teach about tactics.

How should the Army — the Volunteer US Army — be organized, equipped and trained for its job in the last quarter of the 20th Century? A typical question from a general officer trying to decide which way to go in equipment development, tactical evolution and organizational changes.

All these questions hinge on one ultimate question — *What is the purpose of the United States Army in the last 25 years of this century?*

As military men we are vitally interested in answers to all these questions; answers about which we can achieve some reasonable and logical consensus. We live in a time of change. In such times it is difficult to reach a consensus; it is more difficult to have the effects of a consensus percolate throughout the system in a short time.

The purpose of this commentary is to develop logical guidelines which might help answer questions about what we should be doing as we approach the year 2000.

The President's 1972 foreign policy statement to the Congress signalled a change in the United States' long standing strategy of containment.

"Our alliances are no longer addressed primarily to the containment of the Soviet Union and China behind an American shield. They are instead, addressed to the creation with those powers of a stable world peace. That task absolutely requires the maintenance of the allied strength of the non-communist world. Within that framework we effect and welcome a greater diversity of policy."

Foreign Policy for the 1970s, Presidential Paper, 9 February 1972.

While many factors contributed to this change, there are three which might assist us in understanding what the change might mean to policies which govern how we organize and equip our military forces, how we teach our Army to fight.

First, possession of nuclear weapons systems by several nations, great and small, has made containment an impracticable strategy; remember, it was devised when the United States enjoyed a nuclear monopoly. Now the increased danger that a nuclear exchange could follow quickly the onset of hostilities makes it foolish to assume that while we might lose the first battles, mobilization would give us superiority and in the end we would win the last battles and so the war.

Second, the threat which containment sought to contain is no longer believable to many public officials. Some say the enemy is too large, too powerful, too awesome; others hold that the enemy, while stronger than ever before, is really quite benign; in any event there is no general consensus about what the threat is to our national security.

Third, there is a growing realization that we can no longer afford to buy

the military forces necessary to make containment a realistic strategy. The enemy is simply too powerful, too numerous, and we no longer have a monopoly on any weapons system. This has probably been true for 15 years. Today, however, growing costs of military hardware and personnel, and strongly competing demands from the domestic sector, have combined to make acutely apparent our inability to afford the forces to make containment work.

Some have suggested that we seek a classic balance between the great powers — US, USSR, PRC, similar on a global scale to the balance achieved in Europe by the Congress of Vienna, and in order to achieve that balance it is necessary to soften the harsh outlines of containment. It matters not what brought on the change, in this period of getting over Vietnam: going volunteer, getting smaller, doing with fewer dollars; we must focus our attention clearly on what we as military men must do to meet the challenges that face our country in the years ahead.

Here, a look at the past is instructive. Historically, the United States has made use of two uniquely different military systems: we shall call them the volunteer system and the mobilization system.

Under the volunteer system, through the 19th century, behind the shield of first the British, and later the US Navy, a small regular ground force of token size was expanded in time of emergency by the raising of volunteer regiments. Following the Civil War, demonstrated shortcomings of the system caused military professionals, notably Emory Upton, to argue for reform. However, neither the political nor military climates in post-Civil War America were conducive to reform. It was not until the fiasco of the Spanish-American War resulted in appointment of a Secretary of War with a mandate for reform that a change could be made. And under Elihu Root the United States in the early 1900s created an officer education system, built a fledgling general staff, established the National Guard and US Army Reserve, and rid itself of the volunteer system. General staff studies of Upton's writings of 50 years earlier and of the experience of the recent war were the genesis of the new mobilization system. First set forth in 1915, shaped finally by the National Defense Act of 1920, the mobilization system has been the basis for Army strategy, organization, force and equipment development, training and education for over 50 years. Two facts about this change are worth noting. First, recognition of the need for change and the basic philosophy of the change itself were 50 years old before the change was made. Second, the change itself was initiated from outside the uniformed ranks of the establishment; it was literally forced on the Army at the outset by its civilian secretary.

Fundamental to the mobilization system is a logic which systematically sets forth a threat, postulates a strategy to counter the threat, establishes force requirements to carry out the strategy, and governs the way we train soldiers and units.

With the US separated until recently from its potential major adversaries by ocean distances and steaming times, almost any statement of force requirements

was quite adequate; a political decision to deploy forces abroad had to be taken in the context of a threat so dramatized that requirements could be revised upward without serious challenge. Besides, there was time to mobilize; we could expand from a 190,000-man Army in 1939 to a million-and-a-half men in 1941, and to 8.3-million in 1945.

Now, the growing strength of the USSR and PRC make ridiculous any force requirements statement based on countering the threat they represent to the United States. There are simply not enough resources of any kind that could reasonably be made available to keep in being forces required to contain that threat. Nor could we mobilize those resources; we are out-stripped materially and in manpower. Time is not available to mobilize, given the growing mutual nuclear threat and aircraft and missile flight times. We have striven mightily each year since Vietnam to structure increasingly constrained forces to somehow meet the threat, rationalizing threat, requirements, or both, to preserve the neat logic of our threat-strategy-requirements heritage. And so, finally, the strategy itself has been rationalized.

Fundamental to the mobilization system is basic rationale for Army training. Under this system, individual training, basic and advanced, has been conducted in training centers; in a mobilizing Army this is the most efficient way. Army unit training programs prescribe how newly activated units are to be trained prior to deployment overseas. BCT, AIT and ATP all are designed basically for mobilization.

In schools, officers learn to perform several grade levels above the rank they hold as students. The basic officer may graduate with a fair grasp of how to be a battalion commander, but he is an ill-prepared platoon leader, and he sallies forth to be assigned to the job for which he is least well-trained. The Leavenworth graduate may be a passable division or corps commander, but graduates less than completely prepared for the command and staff jobs he can expect to hold next. The whole system presumes that mobilization will suddenly require all ranks to serve at higher grades overnight.

And it has long been assumed that America's great mass production capacity would soon flood battlefields with volumes of equipment that would overwhelm the enemy. If ten tanks weren't enough, we would make a hundred, a thousand, ten thousand. The same logic pervaded our outlook on forces; if ten divisions were not enough, by mobilizing we could produce a hundred, and so overwhelm our adversaries. From a few scattered regiments in 1939 we could mobilize 89 divisions by war's end in 1945.

At its inception, the mobilization system was a much needed change; and for many years there appeared no serious challenge to its basis or to military policies which followed logically from it.

Now we live in a changed world; the old system won't answer today's questions. We have adopted a new national strategy, now we must calculate what military policies would best support the strategy, and we haven't fifty years to make up our minds.

Why do we need an Army anyway?

What should be the Army's size and shape to perform its new tasks?

How should the Army be equipped?

What should we train the soldiers to do?

What should we train the officers and NCOs to do?

Why do we need an Army?

The answer is simple — we need an Army to win the first battle of the next war. This is so because militarily the winning of the first battle or battles of the next war is a task that only a military force can accomplish, and there is no longer the time nor have we the resource potential to count on mobilizing to win the last battle and so the war.

There are two critical situations in which we must win the first battle.

The first is in Europe, and involves the US commitment to NATO. However, while war in Europe is still the most demanding requirement in terms of men and materiel, a prolonged war in Europe is probably a least likely circumstance. Fear of crossing the nuclear threshold early and the basic Soviet conviction that they can win without using nuclear weapons, will encourage very early negotiations to end any conflict. Therefore, a long war in Europe and mobilization of other than select, highly ready reserve component forces for that war are highly unlikely.

Secondly, and most likely, the Army must be ready to deploy a contingency force to some area of the world considered vital in the political context of the contemporary balance of power. This requires austere active Army contingency forces, highly ready, extremely mobile, capable of rapid deployment, short duration operations, and rapid re-deployment. Here again winning the first battle is essential.

What should be the size and shape of the Army?

The Army, especially the active Army, will be smaller than prudent military men think necessary, not because the tasks just set forth require a smaller Army, but because of increasing constraints on dollars, increasing costs of military and civilian manpower, and because we have elected to try to man our military establishment with volunteers. At the moment, the active Army is stabilized at 785,000 with the goal of manning 16 divisions within that manpower authorization. That's the smallest Army the United States has had since June of 1950, and the last time the Army had 16 divisions, it was made up of 970,000 men. A smaller Army whose main purpose is to win the first battle of the next war must focus on survivability and sustainability; its training must insist on readiness to win the first battle(s) in order to increase the decision-makers' latitude in the making of the nuclear decision. At the same time, the long term sustainability of the force would be not so important as in the past. Sustainability is contingent upon an austere complement of the views of war — transport, ammunition, POL, medical evacuation. Survivability is contingent upon improved readiness of active and selected reserve component forces to fight and win the first battle outnumbered.

How should we equip the Army?

One significant lesson of the October War is that the equipment of either side, regardless of some differences in sophistication, is not the deciding factor in battle. What is clear is that while we might expect to improve our battle performance by 10 per cent by improving the equipment, we can improve our battle performance a hundredfold by improving training. Therefore, the emphasis in equipment development must be on simplicity, effectiveness, supportability and trainability. While this has always been important, it is now imperative, for in the first battle(s) of the next war we expect to fight outnumbered. Therefore we must insure that through training we can achieve exchange ratios of five or even 10 to one.

Unless sophistication can significantly improve the exchange ratio, the decision should be for simplicity in the interests of trainability.

Unless supportability — maintenance, supply, repair, recovery — is simpler, less complex and less costly than the current system, the decision should be against the less supportable system.

What should we train the soldiers to do?

The United States Army must train its soldiers to fight and win the first battle(s) of the next war, and to fight and win those battle(s) outnumbered.

As before, the first step in soldier training is achievement of a high state of excellence in individual soldier skills. The second step is to integrate him into an effective team. And now the third step — keeping the soldier and his unit at a high state of readiness — is essential. Now more than ever we must all understand the dimensions of the modern armor battlefield. For only if we do can we build in the soldiers the confidence and conviction that we can and will win. They must master their weapons, understand their enemy, know tactics and master the clever use of terrain. All this, day and night, good weather and bad, rain, sleet, snow and cold. They must master the soldier's environment.

One thing this suggests is that no longer should we expect the force we are most likely to employ to be raised by mobilization, followed by institutionalized training of individuals in centers.

A smaller Army probably cannot afford the manpower, instructors, school overhead and installations to conduct all individual training in training centers. Recognizing this, we are moving toward a reduced individual training cycle that will combine BCT and AIT. Additionally, we are devising a system that will enable us to tailor our training output to the needs of units in the field. As early as possible the soldier should know to what unit he will be assigned; and as much as possible he should train from the beginning with other soldiers of his own unit. Eventually this could move us closer to some sort of regimental system which would improve quality and motivation to our soldier training.

Unit training programs must be designed to sustain volunteer active Army forces at a high level of combat proficiency. We have already set aside the Army training program, replacing it with the Army Readiness Training and Evaluation Program (ARTEP) for unit training.

Finally, what should we train leaders to do?

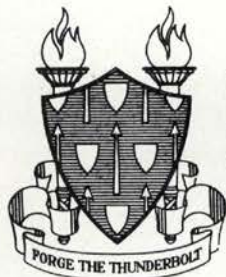
The leaders should be trained to lead. They are not managers, although certain managerial skill is essential; they are not political scientists, although a certain understanding of the realities of the world in which they operate is important. *How must we train the leaders to enable them to provide the kind of leadership we need?*

First, we must insist on proficiency in grade. Basic NCO course graduates must be proficient squad, crew and section leaders; advanced NCO graduates must be proficient platoon sergeants. Basic officer course graduates must be proficient platoon leaders; career course graduates proficient company commanders and unit staff officers; Leavenworth graduates proficient battalion commanders, brigade or divisional staff officers. We have already moved in this direction in our service schools, and will move even further in the next few months.

Second, leaders must learn to train others to proficiency with limited resources. Education, particularly officer education, has concentrated on how to mobilize, train and deploy forces. The basic outlook of this approach is one of nearly unlimited resources. Everything is on the increase; if there are shortages it's a matter of time only until they are satisfied. Our Vietnam experience did nothing to dispel this misapprehension. No service school teaches a course in how to reduce an Army, or how to operate with constrained resources. When resources are limited we tend to try to do everything a little less well instead of reordering priorities to see what we cannot afford to do at all any longer. Today's officers and NCOs have to learn how to achieve and maintain high standards of individual and unit proficiency with limited resources. It can be done. It requires determination, a certain cleverness, considerable skill and a conviction that it can and will be done.

Finally, leaders must understand the basic demands of leading soldiers in the first battle of the next war. It is not without cause that the majority of Israeli casualties in the October War were among officers and NCOs — in their army they lead. The clear lesson of war is that, in the end, the outcome of the battle depends on the excellence of training, the quality of leadership and the courage of soldiers. It is also quite certain that the side that thinks it will win usually does. Conversely, the side that thinks it may lose, or whose soldiers are not convinced that they can and will win regardless of the odds, usually loses. Therefore, the United States Army must enter the first battle of the next war with soldiers whose state of training, whose confidence in themselves and their leadership, and whose courage is such that they can fight successfully at odds of ten- or even 20-to-one and win. Win through excellence in the effective use of weapons, win by using clever, effective, sound, and carefully thought-out tactics. Win because they are better trained. Win because they are better led. Win because their courage and conviction tell them that they can enter a fight outnumbered, and come out a winner.





FORGING THE THUNDERBOLT

"Man Machine Interface"

The interface between man and machine remains a primary concern of the Armor School. The Directorate of Training (DOT) was created to address the "man" half of the combat development equation. The Director of Combat Developments (CD) is responsible for the machine half of the equation, e.g., coordinate the evaluation and issue of the *M60A1E3*. That involves identifying and analyzing new job tasks generated by equipment and tactics and then designing training programs to introduce them to the Army.

At the Armor School, we consider ourselves a requirement-generator, a user and the intercessor on behalf of the user—the troops. In other words we subject equipment developed by TACOM, ARMCOM and other agencies to user tests. At the same time we try to identify the impact of equipment changes on tactical doctrine and training methods. We also seek to develop concurrently new system-related training devices; however, predicting the final form of the range-finder, sights and power controls of the *XM-1*, with two competing contractors, is a game fraught with potential misstep. Anticipating the final conformation of the loader's and tank commander's stations of a new or modified tank is tricky, at best.

Thus, we human engineers are frequently presented with a *fait accompli* by our compatriots in R&D. Last minute changes in combat vehicle design, usually made to capitalize on the most recent research results, often play hob with plans to train tank crewmen, track mechanics, turret mechanics and motor sergeants.

We do try to insert ourselves into the equipment development process in order to develop training programs which are exportable to troop units along with the new equipment. Rather than bringing hundreds of soldiers into Army schools to re-train them, TRADOC prefers to transfer qualified commanders, crewmen and maintenance men from the current weapon system to the new one—right in the unit. That course of action is cheaper, more efficient and psychologically more satisfying. It also reinforces unit integrity and loyalty.

Beyond the question of how to adjust to changes in equipment and doctrine, is the question of how do we build an army for the 1980s. The US Army has trained for mobilization in every modern war from 1861 to 1972—over one-hundred years of converting civilians to soldiers like mass-producing Sharps carbines, Model T Fords and liberty ships. In the periods between international wars we kept our standing army small because everyone knew that when the wintertime patriot was galvanized into action, he could be trained in a narrow

MOS and folded into a mass production combat unit.

It would appear that on today's modern battlefield, where every weapon invented since the time of Leonardo Da Vinci is present and can deal rapid death, that destroying a like enemy while surviving to fight again is too complex to train men by stamping them out like waffles on short order.

In other words, our proven system of BCT/AIT followed by BUT and AUT may be as obsolete as the horse cavalry. For years the Army has trained on a mobilization training cycle, that is, a cadre'd unit is filled with tank crewmen trained at Fort Knox. It then launches its own annual training cycle which culminates in the tank crew gunnery exercise and separately, in an Army training test without live fire. Then the old cycle begins again. This produces a sine curve of gunnery proficiency and a cosine curve of tactical proficiency, and the twain never meet.

With gunnery proficiency and tactical proficiency peaking at different times, a consistent level of unit proficiency for combat is rarely, if ever, attained. The constant turnover of personnel exacerbates this problem. A tank company caught at a low mark on the sine curve, and with a recent flood of replacements, could be in a ghastly position of unreadiness for combat for several months.

The Army can no longer afford that rise and fall in true unit readiness in the real world of instant coffee and instant battle.

Our present situation is governed by two principal factors:

One is the need for continual readiness because strategic and tactical mobility permit opposing forces to come together in mass in a matter of days or hours—a Cannae is once again possible.

The *second* factor is the deadlines of the modern battlefield. Tank guns that can penetrate any armor, and antitank missiles which strike an unwary opponent at 3,000 meters, offer instant death to the crew and unit that are not trained to use terrain, their weapons and their knowledge of the enemy with high professional efficiency.

You have to practice ducking, bobbing and weaving in peacetime, because the modern battlefield has no tolerance for learning. Thus, we have to get our soldiers into the unit as soon as possible, keep them in that unit longer, train the unit better, and devise training programs which keep our units at a high level of proficiency at all times to achieve instant success.

How do we do it, and keep the budget from shooting off the chart? The Armor School and Center are re-

designing our training system to produce trainers rather than just replacements at all grades. These trainers, officers and sergeants, will carry to the field the latest doctrine polished in the school's knowledge of the latest devices designed for use both in the school and in the unit, and the latest training techniques. The TRADOC school and training center system will no longer attempt to supply fully-trained tank crewmen who can flesh out a unit which will then train for combat. TRADOC will supply the tacticians, trainers and professional experts who will use the latest equipment, the latest devices and the latest training media to keep individual soldiers, sections and platoons combat-ready. The training of companies and battalions may remain partially cyclical because of the competition for training resources — access to maneuver areas, ranges, ammunition, dollars, etc. But the platoons, which require smaller increments of resources, have to be kept combat-ready at all times.

We are developing several techniques and means to achieve that improved state of training readiness:

First is advanced individual training for the 11E, tank crewman.

USATCA trains crewmen for the *M60A1* tank in eight weeks, but the center has to add on training for the *Sheridan* and the *M60A2*.

It did train *M60A2* crews with an NCO tank commander who took his entire crew into an *M60A2* battalion in Europe for reserve units. USATCA will also include special training on the *M48* tank within the normal eight-week AIT.

Second is the new track vehicle mechanic course. Instead of sending men through eight weeks of wheel vehicle mechanic AIT at Dix or Polk, and then sending them to Knox for eight weeks of TVM training, we will take a man from BCT to 12 weeks of training as a TVM with WVM skills included; then he goes directly to a unit. This will save not only four weeks of training but also an unnecessary PCS with the associated losses of time in the unit as well as the individual's morale. Third, our basic NCO courses are now designed to produce either a tank commander or a scout squad leader in eight weeks. The course is job-oriented and covers only those training tasks which the sergeant E-5 needs to become proficient in the latest tactics, gunnery, maintenance and training methods. The students are cross-trained on the *M60A1* and *M60A2*.

In like manner the advanced NCO course focuses on the platoon sergeant. The course no longer addresses the duties of the operations sergeant, first sergeant and like jobs which the E-6 and E-7 will not see for several years after attendance at ANCOC. In other words, the Army is cutting over-training by training the NCO for his next skill level and job.

There are other self-paced, performance-oriented non-resident courses being designed for incumbents in duty positions such as first sergeant and operations/intelligence sergeant, which only a limited, select number of men will occupy.

Also, our basic Armor officer course focuses on the practical aspects of commanding an *M60A1* tank and

the *M551 Sheridan* and then leading a platoon through training and maintenance for combat.

The training objectives of the officer advanced course have been narrowed to the duties of company commander and battalion staff officer. Through this sharper delineation of course purpose, we hope to produce better trained leaders who can train their units.

The Armor School trains the trainer who has up-to-date knowledge of the latest equipment, training devices and training method — the *M60A2*, the product improved *M60A1* and REALTRAIN. The man and the machine will fit together . . .

1975 ROTC Basic Camp

Approximately 2500 cadets are expected to attend the 1975 ROTC Basic Camp supported by the 4th Training Brigade (BCT) beginning 30 May. This is the fourth consecutive year that the camp has been held at Fort Knox and attendance will be up approximately 35 per cent over last year's camp.

A unique aspect of this year's camp is that 200 female cadets will participate in the training. This will be the first time that women have taken part in Basic Camp; consequently, a new form of training challenge has been added. Both male and female cadets will be living in the same building, but on separate floors. Although facilities and program requirements for the females differ slightly from the males, they will participate in most training together in mixed male/female squads.

All ROTC cadets will receive 241 hours of instruction. The female cadets will participate in the same training as the male cadets, except that while the males receive 69 hours of tactics, the females will receive only 46 hours. In place of the additional 23 hours of tactics, the females will receive instruction in subjects that will orient them more toward combat support units in defensive situations and extra training in first aid, communications and discipline/leadership. Other subjects that the females alone will receive are combat service support, passive air defense, fire protection, water safety and survival.

National Guard Basic Course

A four-week AOB is being developed in response to requests from the Army National Guard. This four-week course will be the final phase of a four-phase OCS/Branch qualification program and will be conducted at Fort Knox with assistance from the State Army National Guard Adjutants General. The first class is programmed for FY 77. The National Guard plans, through this program, to reduce the number of officers who are not now certified as Branch-qualified. At present, the only way to be certified Branch-qualified is to graduate from the regular, 12-week resident AOB at Fort Knox. The four-week course will relieve the financial burden National Guard Officers incur by taking 12 weeks leave from their normal occupations, therefore enabling more National Guard Officers to attend the basic course. □

Pages from the Past

LIEUTENANT THAYER TO GENERAL ADAMS:

"I have read with much interest your article recently published in the Cavalry Journal concerning the absence of mounted troops with Washington during the Revolutionary War.

"I desire to call your attention, however, to what is apparently an error in your article in the statement that Washington had no mounted troops with him during the battles of Princeton and Trenton.

"The First Troop Philadelphia Cavalry, then known as the "Philadelphia Light Horse," under the command of Captain Samuel Morris, accompanied Washington's Army during this campaign and took part in the above mentioned battles.

"The Troop regards with particular pride its record in this campaign. The original Troop standard carried during that period is at present in the Armory, as well as a portion of a Hessian flag taken from a body of Hessians whom they captured during the battle of Trenton.

"In January, 1777, the Troop received an autograph letter from General Washington, thanking them for their services. The original of this letter * * * is at present in possession of one of the descendants of Captain Morris. * * *

"I enclose for your information a **fac simile** of this letter."

FAC SIMILE OF WASHINGTON'S LETTER

The Philadelphia Troop of Light Horse under the command of Captain Morris, having performed their tour of duty are discharged for the present —

I take this opportunity of returning my most sincere thanks to the Captain and to the gentlemen who compose the Troop for the

many essential services which they have rendered to their country and to me personally during the course of this severe campaign. Tho composed of gentlemen of fortune, they have shown a noble example of discipline and subordination and in several actions have shown a spirit of bravery which will ever do honor to them and will be gratefully remembered by me.

/s/ George Washington
Given at Headquarters at
Morris Town this 23d Jan 1777

The Cavalry Journal
May, 1911

MORE RESPONSIBILITY FOR THE TROOP COMMANDER

One of the most serious phases now confronting the cavalry arm in our service is the constant interference with his troop by a great many post commanders who take upon themselves to prescribe minutely the course and method of instruction for his command.

Par. 261, Army Regulations, 1908, state: "The commanding officer of a company is responsible for its appearance, discipline, and efficiency, the care and preservation of its equipment; for the proper performance of duties connected with its subsistence, pay, clothing accounts, reports and returns." It would thus seem that he, being under this paragraph responsible to such an extent, would have the authority to have a say in the matter of instruction of his command, but it is a well known fact that he is in many commands a mere figurehead, and in fact, a colonel's first sergeant.

The Cavalry Journal
March, 1911





THE PATTON MUSEUM

John A. Campbell
Director, Patton Museum

ON 30 May 1949 the Army and the nation dedicated a building and an Armor collection in memory of General George S. Patton Jr. and the many thousands of soldiers who have died fighting in the armored forces of their country. That date marks the official beginning of the Museum of Cavalry and Armor, but in reality it began, perhaps, in Mexico on 14 May 1916 at the Rubio Ranch when Lieutenant Patton commanded the first mechanized assault conducted by US troops in armed combat; or 10 November 1917 when General Pershing directed formation of an American tank corps in France; or later still on 10 July 1940 when Congress authorized activation of the Armored Force at Fort Knox, Kentucky, under the command of General Adna R. Chaffee.

The Patton Museum has its roots in each of these milestones. Several more new and important milestones are in the museum's future and the purpose of this article is to outline what these will accomplish for the members of modern Cavalry and Armor over the next several years.

An Army museum is more than a collection of a few old guns, a couple of tanks and artillery pieces plus walls and walls of Army photographs; it is an institution with a definite role in preserving and presenting the history of the US and foreign armies.

In 1974, when General DePuy spoke to the Third Annual Army Museum Conference he stated, "Your mission is to present history — good and bad. The soldier of today must know of the mistakes of the past and the soldier of tomorrow must be made aware of those which are made today." Although General DePuy did not specifically men-

tion equipment as he directed his remarks to the tactical and leadership influences, I feel he would agree we must present our technological discards and preserve them for future soldiers.

How does an Army museum come into being? How does it fulfill that purpose?

The goals and purposes for which the many Army museums are collected and exhibited are varied and complex, but nevertheless, once established and recognized by the Department of the Army, the mission is explicit — preservation, education and entertainment.

Recognized museums operate under the provisions of several Army regulations which establish standards of personnel qualifications and security of historical property which includes weapons, preservation, restoration, and general areas of representation. The latter provision is quite essential to preclude uncontrolled competition within the Army system for funds and historical property and to avoid pointless duplication in wide areas of exhibits.

The basic regulation (AR 870-5) which establishes unit history programs and annual historical reports also is the regulation that permits the installation commander to establish and support an Army museum. An authorized museum may well be the only organization in the Army without a requirement for an equipment TDA.

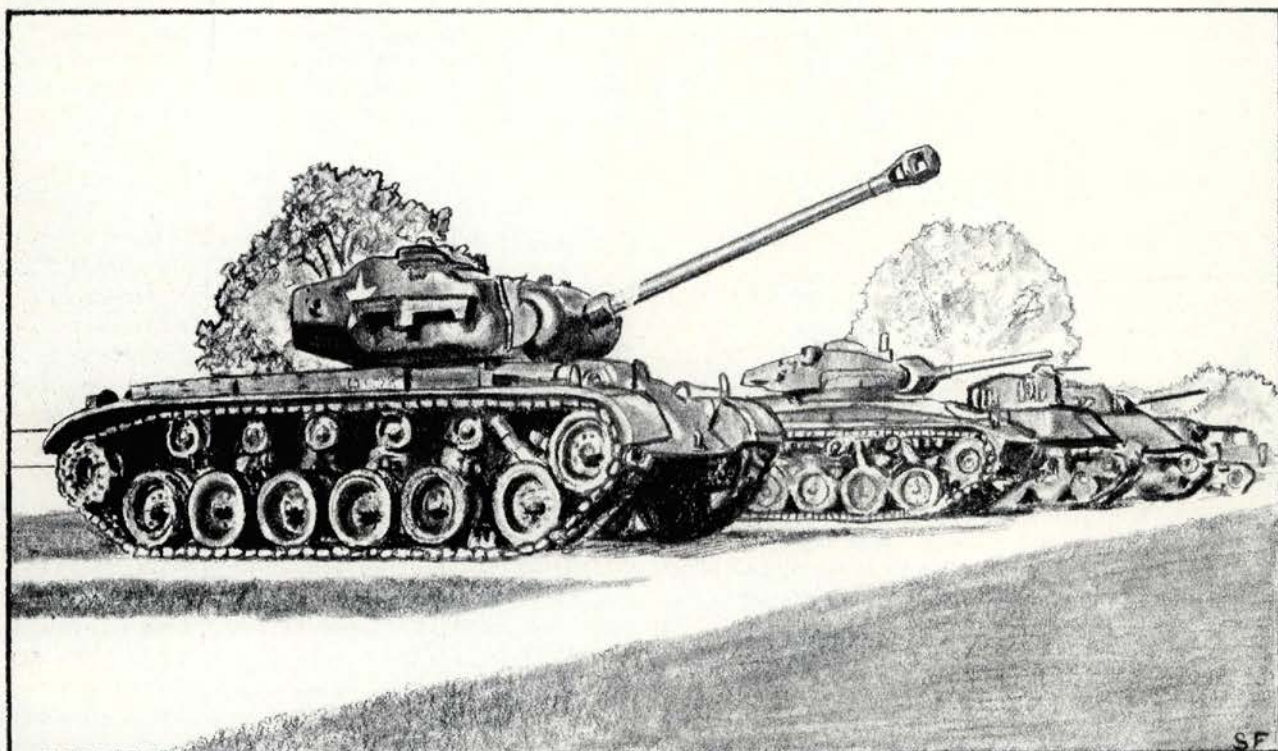
Within parameters implied by the museum's recognized and authorized mission, the commander may allocate that equipment necessary to support the collection. Obviously, sound judgment and budget limitations are the prime controls applied.

SINCE World War II many efforts have been made to construct museum facilities under MCA programs, but, although authorized, they were justifiably placed in the lowest priority in the Army program. Since facilities were available in other buildings, collection and presentation programs were possible and practical. These programs developed several outstanding collections and produced a viable system throughout the Army and the other armed forces. A bonus frequently realized from the selfless efforts of a few devoted individuals was the military and public awareness that these collections fostered plus a very fine group of dedicated museum curators. This resource hasn't reached its potential — most Army museums are still in the first generation of professional evolution. Perhaps surprisingly, museum professionals are a mobile group and this factor alone will strengthen our museum system and enhance professional competence.

means is that the museum, the property, both historical and issue, plus employees are identical in relationship and responsibility to the US Army as are the other staff organizations on Fort Knox or any other installation. The aforementioned organizational relationship is explained because of the question frequently raised regarding museum logistical support and the role of the closely allied foundations and associations.

In essence, two functions have been identified in museum support and operations; however, in the Patton Museum and many other museums in the Army system there is a third very essential element — the non-appropriated souvenir or gift shop. They provide a service to the visitor plus a financial benefit to the parent museum.

The Army cannot be in the business of selling things, not even in a museum which is visited by hundreds of thousands of civilians as well as military annually who, almost without exception, want a souvenir of the post, the



Reduction or the non-existence of MCA support and rather austere quarters fortunately has not dampened the military and civilian community enthusiasm and appreciation of the fine collections available following World War II.

Foundations and associations have been formed to assist the local commanders in realizing what hard pressed defense budgets couldn't afford. Many local merchants, citizens, industry and, almost without exception, military personnel of all ranks have been afforded the privilege of contributing to museum memorial building funds. These associations are authorized by the Secretary of the Army, when sufficiently financed, to construct DA-approved buildings on federal property for the specific purpose of housing historical collections. The structures, when complete, are donated to the Army and become government buildings, meeting all requirements and receiving identical support as other structures on that installation. What this

museum or, in the case of Fort Knox, General Patton. The benefit to the visitor is readily understood — he remembers the museum and, above all, the US Army and Fort Knox. Materials purchased by the gift shop fund for the museum cover a wide range of select necessities and rare historical properties otherwise impossible to procure.

IN 1965 a group of dedicated citizens signed a memorandum of understanding with the Commander, US Army Armor Center in which they pledged to collect funds and construct facilities to accommodate the armor collection at Fort Knox. This marked the beginning of a long financial struggle. Elaborate designs and plans were proposed — these were magnificent and without reservation envisioned the finest military museum in the world.

The plan was too ambitious and obviously beyond the fiscal grasp of the community, however, money was raised and errors in judgment recognized and, as for any developmental programs, many good sound features were developed. The viable and energetic Cavalry-Armor Foundation, Incorporated, emerged ready to meet a challenge and work with the Armor Center on a bite-size program, segments of which the foundation members and commanders could undertake and complete during their periods of assignment.

The program which evolved along with the realigned Cavalry-Armor Foundation goals is a modular concept of construction, which the Armor Center refers to as phases, each encompassing the building and museum collection for a section of the museum.

Phase I of this program was dedicated on 11 November 1972, the 87th anniversary of General Patton's birth, and contains the basic requirements for the museum; the lobby, offices, theater, comfort facilities and souvenir shop area. These obviously will not have to be repeated in the succeeding phases, however, certain modifications and realignments will occur when additional space becomes available in following phases. Phase I also accommodates several other features wanted in the museum: recognition of Armor's heritage, Fort Knox and Armor's role in those periods of history from World War II to the Vietnam Conflict, and exhibits of the personal effects of General Patton. Again, this phase of the museum will not change to any major extent. It will be improved and several small additions realized, however, the theme for this phase is established and of course fulfills the basic assigned mission, from DA, for the museum of Cavalry and Armor.

Phase I required eight years of effort on the part of both the military and civilian communities to develop the plan and raise the necessary funds. However, success begets success and following one year of record attendance (404,000 visits — the highest of some 68 Army museums), the Cavalry-Armor Foundation informed the Commanding General they were financially set to construct the second building.

Construction was started on 1 April 1974, sixteen months following the dedication of Phase I. Construction was completed in the late fall and the building was released to the Armor Center for completion and installation of refinements necessary to accommodate the exhibits.

Phase II, dedicated on 16 May 1975, provides the museum with a basic reference library, historical property storage and an increase of some 8,000 square feet of exhibition galleries which is an increase over the 6300 square feet available in Phase I. This phase, like Phase I, has limited basic requirements to support the museum operation. In future phases, it will be noted, the support requirements decrease.

The library of Phase II is not a lending library; however it is available for use to all members of the Armor community, military students and individuals conducting technical equipment research related to properties in the museum collection. The museum, at present, is not staffed to answer detailed questions nor assist in involved research. Basically, the library inventory is limited to support the museum mission and collection.

The conference room, adjacent to the library, is an educational facility available to the Armor Center and recognized associations dedicated to military history and to the military community.

Phase II continues the theme of Phase I, with the requirements of historical recognition covering the period since the Army's formation, and enters the modern mechanized era of Armor. Again, as in Phase I, the Armor Center has accomplished the basics — at a glance, the visitor views 50 years of Armor; on his left the tank engines spanning the years from the Renault *FT 17* of World War I to the modern engine of today, the basic *AV 1790*. There are gaps certainly, but this must be part of the Armor community goal, to fill gaps. Opposite the engines are the tank representatives of battlefields which span much of the world. Physically separated, but only for the visitor's appreciation, are the latest additions to Cavalry and Armor: the *UH1B* gunship, the *AH1G* Cobra, the *AH56A* Cheyenne and an *OH6* resting in its sandbag revetment. The reader and the visitor will be prone to point out the Cheyenne is an imposter among this proven company, however, the Cheyenne must be regarded as another technological milestone in our history and belongs to the future.

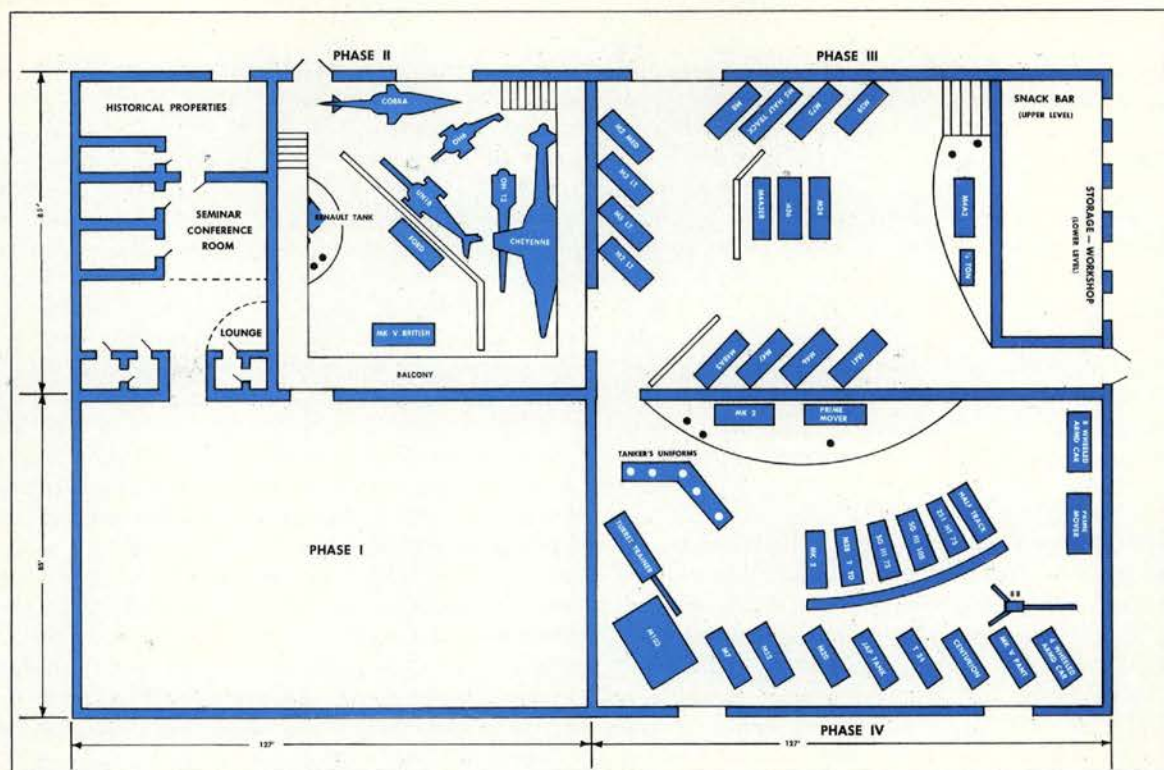
FOLLOWING the success of Phase I and the unexpected, but welcome, announcement by the Cavalry-Armor Foundation that money was available to begin construction of Phase II in early 1974, the Armor Center Commander directed, in September 1973, the development of plans for Phases III and IV (plans for Phase II were approved in April 1973) and also plans for grounds and streets improvement.

The Commander was not directing plans for the building as these had been agreed upon prior to Phase I. Requirements were to determine what exhibits were needed and which priority should be applied to each.

A vast majority of the museum's priceless collections is on exhibit in the open park surrounding the museum and is being subjected to the most rapid deterioration armor vehicles have experienced. Many of these are rare, one-of-a-type remaining models in museums. With a criterion of which was the most valuable, rarest and in most critical state of deterioration the selection was made to exhibit those vehicles in Phase III which represent the classics in armor design from pre-World War II through the close of that war, thus limiting the exhibits to those shown in the floor plan (page 20).

In conjunction, Phase II will be redesigned in theme and exhibits to reflect World War I armor. Minor realignment of helicopter exhibits is planned to accommodate change in configuration of the armor vehicle displays. The changes indicated in the library are inconsequential.

Phase II will provide the final planned support accommodations, a workshop-storeroom on the ground floor level and a second floor vendor-operated snack bar. This complex will occupy an area 24 by 78 feet in the east wing of Phase II. From the snack bar window the visitor will have a panoramic view of the exhibit floor, the Keyes Park area and a general view of Fort Knox. Phase III will have the



same 17-foot ceiling as Phase II. The floor and doors are all designed to accommodate the largest equipment in the collection which includes an *M103* tank.

Several items now on exhibit in Phase II will return to storage when Phase III is complete to return in Phase III and Phase IV upon completion of the latter phase. These measures, which might appear to deny the visitors appreciation of the complete collection, are necessary for preservation and for the purpose of avoiding extremely costly restoration. Many of the items currently on display outside will be removed in the near future, when determination is made by the museum staff that deterioration is approaching an advanced state.

The final phase in the current program will exhibit the vehicles and equipment shown in Phase IV. As in Phases II and III this phase will have the 17-foot ceiling, large doors and floor capacity to accommodate the largest vehicles. It should be noted that the various phases include only items which are now on hand. In the event new items are received, and hopefully they will be, selected substitutions will be made. But, nevertheless, there will always be outside displays and a sizeable number of items in storage for limited exhibit.

This floor plan depicts the completed program as currently planned. Phase III, in the completed plan, has changed from armor of the world for the World War II period to US armor, pre-World War II to the present. Phase IV will exhibit primarily armor of the world and limited US vehicles which cannot be accommodated in Phases II and III. Each phase has life-size dioramas which are indicated by the vehicles in the dark areas along one of the phase walls. Throughout the entire program the visitors will be afforded a view of a relatively complete phase of Armor history—care has been taken to avoid disrupting an established phase while constructing and integrating the next phase.

At the conclusion of the four-phase program, the museum will occupy over 42,000 square feet of floor space of which 36,000 will be exhibit space. While not one of the largest museums in the military system, the Patton Museum will provide the most complete collection of armor in a climate-controlled environment and, within limits, perpetual preservation.

In conjunction with the four-phase program, an external improvement plan was developed which would be accomplished with Phase II and be extensive enough to accommodate the balance of the program. Primary changes are in sidewalks, state flags on individual 14-foot poles and evergreen shrubs bordering the building and sidewalks.

FORT Knox historical recognition is not bounded by the walls of the Patton Museum and the streets of Keyes Park where the armor of nations pose in their military positions. The Armor Center, before it became the home of the Armored Force in July 1940, served as an Artillery training center in World War I and, following cessation of hostilities, was host to thousands of summer maneuver troops, Civilian Military Training Corps (CMTC) students and was, for a short period, set aside as a national forest. Fortunately for future generations, representatives of these early post missions and the local community have not been entirely pushed aside in the expansion of half-a-century.

This area marks the second effort of the Armor Center historical endeavors. Many volunteers and contributors of the community, both military and civilian, have worked and are continuing to collect the records and properties which will provide the soldiers of today and the future a window to the past.

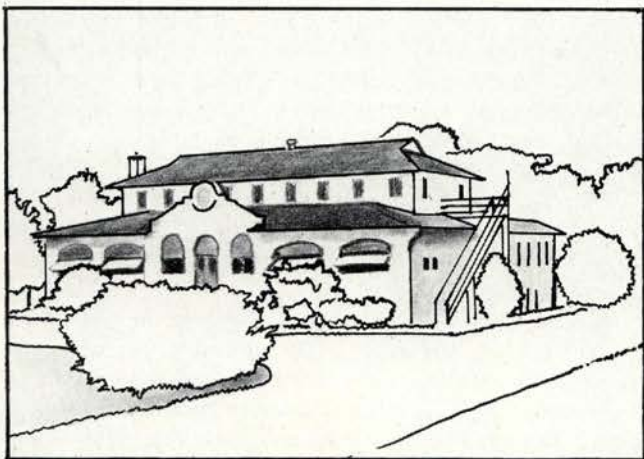
In conjunction with the bicentennial of the nation and the 200th birthday of the Army, the Armor Center will dedicate five bronze plaques marking historic sites on Fort

Knox. These will be followed by four additional plaques before July 1976.

The following are texts of the plaques which will mark the initial high points of the historic tour of Fort Knox.

VISITOR'S HOUSE

This building, completed in the summer of 1919, was originally known as the Visitor's House. It was built by The National Catholic War Council, an organization of the Knights of Columbus, to accommodate families and friends that came to visit soldiers of early Camp Knox. The House had 14 guest rooms, a lounge, writing rooms, a cafeteria and a dining room. A Catholic chaplain affiliated with the Knights of Columbus managed the guest

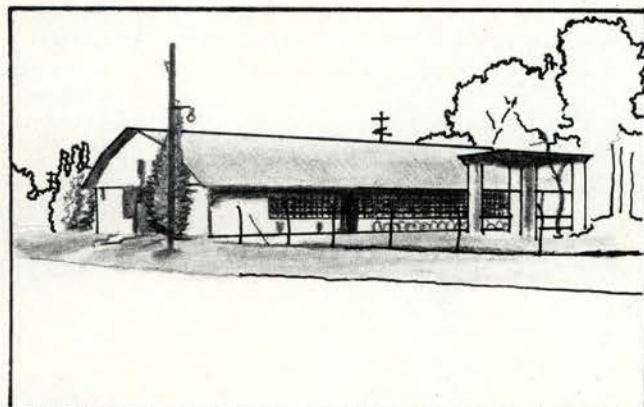


house. In the early 1930s when the Mechanized Forces moved to Fort Knox, it was converted to provide a post hospital and later served as the hospital annex.

In July 1940, when the initial armored divisions in the US Army were formed, the 1st Armored (Old Ironsides) Division established its headquarters here. This building has been occupied by various staff sections of the Armor Center since April 1942 when the 1st Armored Division departed for Europe.

EARLY CAMP KNOX

This building is one of four aircraft hangers constructed during World War I to house the JN4 and JN6 (Jenny) aircraft of the 29th Aerial Squadron. Following inactivation of the 29th Squadron, the building was occupied by the 31st Balloon Company. These units were stationed



with the Camp Knox Field Artillery Training Center to provide observation support. In 1930, this hanger was moved to its present location, from the area now occupied by Godman Army Airfield, to serve as a dance pavilion and later a gymnasium. It was converted to a Teenage Hangout (TAHO) Club in 1955. The hanger and the adjoining fountain occupy the site of the Construction Quartermaster Club called the "Con Quar Club." Con Quar members beautified the park in 1919 and constructed the fountain as a memorial to those members who built Camp Knox. These structures are some of the original buildings of Camp Knox.

US ARMY ARMOR CENTER

The Armor Center Headquarters Building, Chaffee Hall, was constructed in 1934 to accommodate the headquarters of the new Mechanized Force, which was activated at Fort Knox in 1932. The initial unit to join the new force was the 1st Cavalry Regiment from Camp Marfa, Texas. In 1936, the 13th Cavalry moved from Fort Riley, Kansas, to join the 1st Cavalry and other units at Fort Knox to form the 7th Cavalry Brigade (Mechanized). A commander of the brigade was Brigadier General Adna R. Chaffee who also commanded Fort Knox and the Mechanized Force. General Chaffee retained his dual command until 10 July 1940 when the Armored Force Headquarters



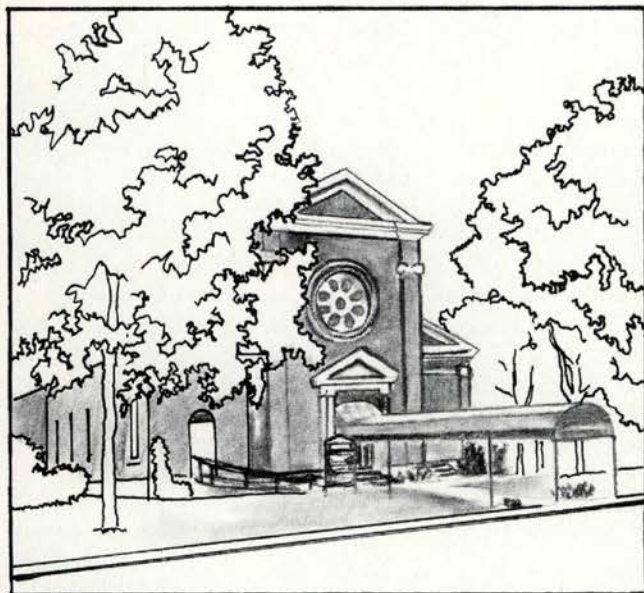
was activated at Fort Knox. General Chaffee commanded the Armored Force until his death in August 1941. He is regarded as the father of American Armor.

The headquarters of the US Army Armor Forces has remained in Chaffee Hall since its formation. The Court of Honor which surrounds the Armor Center flag pole, was dedicated in 1953 in memory of those who served in the 16 armored divisions of the US Army. The Court was enlarged in 1957 to include the Mechanized Cavalry Groups of World War II.

MAIN POST CHAPEL

Formerly Saint Patrick's Parish Church, erected in 1899 by the Stithton Catholic community. Originally the Saint Patrick's Church was located at the Post Cemetery and

recorded its first baptism in 1831. When the government purchased the town of Stithton in 1918 for the building of Camp Knox, the majority of the Catholic community joined the Vine Grove St. Brigid's Parish. In 1920 the church was converted to an auditorium for the post and



used for this purpose until 1938 when it was restored as the main post chapel. Housed in the steeple is the original bell, inscribed "St. Patrick's Church, Stithton, Kentucky 1904." The church building is constructed of hand made bricks and handcut foundation stones. This is one of the few remaining buildings on post from the town of Stithton, Kentucky.

POST CEMETERY

Saint Patrick's Parish Church and cemetery occupied this site from 1831 until 1899. The church was relocated to Stithton in 1899. When the Post Cemetery was established in 1920, the stones from the foundation of the Old Saint Patrick's Church were used to build the small caretaker house and cemetery walls. The first grave in the Post Cemetery was that of Gerald Collins, a dependent child, in April 1920. The first soldier buried was Norman



Curry in June 1921. The Armor Center Commander, Major General Hugh J. Gaffey, killed in an airplane crash at Fort Knox was buried here in June 1946. German and Italian prisoners-of-war who died at Fort Knox during World War II were buried in a special section of the cemetery. Prior to development of the Van Voorhis housing area in 1957, the Reuben Jones and Pearson family cemeteries were relocated to the Post Cemetery area.

ADDITIONAL PLAQUES

The four plaques programed for 1975 will mark historical sites of the town of Stithton, the Army hospital, the Armored Force School and the Armored Force Replacement Training Center.

Members of Armor, in the rush of a 30-plus year career, often do not stop to feel the history they live with and in many instances shape. They do after many years, but then it is frequently too late. The markers are gone — progress couldn't tolerate the buildings of the last generation and through modernization we succeed in destroying a very vital heritage. These sites and structures are the campaign streamers and decorations that Fort Knox has won for the several generations of its service. It is the home of Cavalry and Armor and the home of many soldiers, from privates to general officers.

In recognition of this noticeable heritage the Commanding General in September 1974 approved a program of historical importance. The Visitor's House, more commonly known to most members of Armor as the Army Community Service building, and the TAHO club center were set aside in the post master plan as historic sites and when no longer required for official purposes will become annexes to the Patton Museum. In addition, classic buildings of World War II will be retained in original condition and eventually moved to the vicinity of the Visitor's House to form a historical park of Fort Knox history. The buildings, a company mess hall, battalion headquarters, platoon barracks, chapel and a unit orderly room/supply room combination will be furnished and equipped to authentically depict the soldier's life in the early 1940s.

Although this is an ambitious project and will extend over several years, the initial steps have been taken and the value to future generations recognized. The rest is up to future commanders and historical staffs charged with the Army heritage to bring this worthwhile program to fruition. Let's give future soldiers and the tricentennial something to write and talk about.



LTC JOHN A. CAMPBELL, USA-Retired, was commissioned in Armor upon graduation from OCS at Fort Riley in 1949. He served with the 3d and 14th Armored Cavalry Regiments, the Armored School and in numerous staff assignments. Colonel Campbell retired in 1971 and is currently Director of the Patton Museum of Cavalry and Armor, Fort Knox.

major John B. Hubbard

the care and feeding of the modern tank turret

a revolution has occurred in our tanks over the past decade. The older, simpler M48/M60 series fire-control systems are becoming antiquated. Newer, more sophisticated electronic marvels are taking their place: laser rangefinders (on the M60A2, and soon to be on the M551 AR/AAVs), solid state computers (M60A2), stabilization systems (M60A1, M60A2 and M551), guidance and control systems (M60A2 and M551), and even automatic laying devices (M60A2).

"Tis a shame," say the old-timers as they remember the Battle of Range 42 with the M48s. The young, who cannot remember those days of yore, wonder how marvelous it must have been to have had *all* of a unit's tanks operating for a Tank Crew Qualification Course. The revolution has taken years to land the marvels of electronic technology into our tank turrets, but the situation is not well in hand.

The introduction of electronic fire control componentry has created an untenable maintenance situation for the US Army. The purpose of this article is to identify the nature of this indefensible maintenance situation; and to offer some suggestions on how to correct it before we find ourselves operationally deadlined on the day the proverbial balloon goes up. Lest this last statement be misunderstood, it is *not* the purpose of this article to bemoan the arrival of electronic componentry in our turrets. The older, mechanical systems have finite limits to their improvement potential; and, to keep ahead in the tank gunnery



race, we have no other choice than to exploit this technology with which our TV repairman has long been familiar. Rather, it is my feeling that the nature of an electronic system is so different from a mechanical system (upon which our present turret maintenance system is based), that a totally different approach must be taken. What is the problem?

The problem is that the present turret maintenance system (in terms of organization, skills, and number/types of test sets) will not be able to support the electronic turrets in combat. As Lieutenant Colonel Ebert suggests in his article "The M60A2 in Perspective" (*ARMOR*, January-February 1975) the repair of these type turrets can be extremely difficult under the best of conditions in peace. In view of the accelerated training periods and limited "hands-on" experience characteristic of a mobilization (however limited), it is doubtful if this success can be achieved in combat. Let us now review why this situation exists.

In contrast to the mechanical systems of the older M48 and M60/M60A1 series turrets, a malfunctioning elec-

trical component has no tell-tale sign to aid in locating the malfunction: no dripping oil, clunking gears, or whatever. Frequently, the first indication that an electrical component is faulty is the sudden realization by the crew that the computer or the rangefinder no longer works. A broken wire in a cable could be the culprit, yet to the ear and to the naked eye, nothing seems amiss. The person expected to locate and correct this malfunction is the company turret mechanic, an individual who is seldom more than an E-4 and who might have just arrived from CONUS. It is of interest to note, that as a guide for the designers the typical Army turret mechanic should not be expected to be able to read above a ninth-grade level. How then is this man expected to keep operating something as complicated as an M60A2 turret?

This problem has not been totally unanticipated. Early in the conceptual stages, the engineers decided to incorporate the modular replacement concept in the designs of the new fire control components. The various subsystems of a given computer, for example, were to be isolated into a series of "black boxes." Test sets were to be designed which permitted easy identification of a malfunctioning black box. Hopefully, the organizational turret mechanic could identify and replace the malfunctioning black box (with repair of the box at a higher level of maintenance), thus quickly restoring the tank to an operational status. The idea was and is sound, but for a variety of reasons the turret mechanics of

the mid-to-late 1960s had difficulty applying the procedure. By 1972, the alarmingly low operational availability of the M551 turret (the only "black box" vehicle in the inventory at that time) gave testimony to the fact that other measures were necessary. By 1973 the turret mechanic's MOS structure had been revised and the Armor School was rapidly setting up turret mechanic's schools for three MOSs: 45N for M48/M60 series turrets, 45P for M551 turrets, and 45R for the new M60A2 which was coming off the production line. The older 45K MOS was assigned to direct and general support level maintenance units, and the training was transferred to the Ordnance School at Aberdeen Proving Grounds. Therefore, we now find four MOSs repairing our turrets where only one existed before. Has this plan solved our problem?

Evidence collected during the tests of the M60A1E3, the M60A2 and the various "add-on" items for the M60A1 and M551 tanks, indicate that the problem has not been solved. Several considerations appear to have been forgotten:

- A psychological barrier exists for the mechanic about to repair an electronic system. As explained earlier in the article, the mechanic cannot "see" what he is dealing with. There are no oil leaks, bent or broken parts. In contrast, most young Americans learn at an early age how to repair purely mechanical systems. We change spark plugs, engine oil, or replace broken bicycle chains, but how many of us, as a youngster, ever repaired the electrical wiring in our house? Or repaired the television set? This lack of basic contact with electronics means that the turret mechanic does not normally have that innate understanding it takes to reason beyond the simple troubleshooting steps found in the technical manual (if he uses it).

- The troubleshooting steps found in most technical manuals are designed to isolate the malfunctioning component. What is the turret mechanic to do when a series of components malfunction and have overlapping symptoms? Under these conditions, considerable experience and the innate understanding described above is needed.

- Rarely is the organizational

maintenance sergeant experienced in tank turret repair. This is a two-edged sword, for the maintenance supervisor can neither assist the new turret mechanic, nor can he properly supervise him. Tales of successful "dead beating" abound among turret mechanics. Even more because the motor sergeant is essentially an automotive mechanic.

- The test sets are not available to the turret mechanic when they are needed. Reasons are varied: the sets require calibration too frequently and the turn-around time is too great; the

turret continued to oscillate. After several days of puzzlement, the fault was discovered at the direct support level to be simply loose cables—something easily corrected by a company turret mechanic, if he could have isolated it. In another episode, a laser rangefinder test set was found to give different readings as it warmed up (which took about an hour). One wonders what effect a desert sun would have had on such a test set calibrated during a Detroit winter.

- Maintenance Allocation Charts



... the typical Army turret mechanic should not be expected to be able to read above a ninth-grade level. How then is this man expected to keep operating something as complicated as an M60A2 turret?

sets are easily damaged and repair or replacement takes months; the sets are locked up by the motor sergeant for "protection"; the sets are used so seldom that the turret mechanic loses his proficiency with them.

- Some test sets are not capable of diagnosing certain malfunctions. A series of turret oscillation problems were experienced during the summer of 1973 on an M60A1/AOS tank at Fort Knox. The several stabilization test sets used reflected a perfectly functioning system each time, yet the

(found in organizational level technical manuals) frequently allocate relatively minor repairs to direct support. How many engineers realize that this simple test allocation can result in a one- or two-week "down time" for a tank because the direct support unit is 20 miles to the rear, or too busy to get to it right away?

- Technical manuals are seldom used at the organizational level. Except for repair parts identification, it appears to be unethical for many mechanics (turret mechanics included)



The M60A2 and its support and diagnostic equipment. This equipment, and the equipment for the balance of the current US tank inventory, is not always available when needed, and in many cases is unreliable.

to read the appropriate repair instructions prior to starting work. Unfortunately, electrical circuitry must be troubleshooted precisely as spelled out in the appropriate troubleshooting steps. To do otherwise could mean the malfunctioning component could be completely overlooked, or that damage to subcircuits would result. However, in view of the number of changes certain turret manuals have had (the *M551* turret manual has had 11 changes since 1972), there is little wonder that some units might consider them worthless.

- MOS substitutions create untold havoc with a unit's maintenance program. How many tank battalions today have turret mechanics assigned who have been trained on a tank the battalion does not have? Since tank turrets can be radically different, the substitution of an MOS 45R for a 45N is simply not possible.

"But in a 'good unit', these things do not happen!" Right? Unfortunately, they do, but only to a lesser degree or in a slightly different form than in the better units. The author recently encountered a platoon leader who had established as a platoon SOP the policy of not turning on the stabilization system in his tanks. He felt he could never get the stabilization system repaired if it ever malfunctioned. Incredible!

The solution to this problem will

not be an easy one. The first difficulty, that of identifying the problem, hopefully has been accomplished by this article. The second difficulty, that of correction, will involve everyone in the Armor community whether they are an engineer, a tank commander or an instructor in the Armor School. As a possible first step on this thousand-mile journey, the following solutions are offered:

- Maintenance sergeants (MOS 63C) need instruction on turret maintenance so they can assist and better supervise their turret mechanics. Since most of these individuals are in grades E-6 and E-7, such training would be imperative for any unit issued the tanks.

- The existing organizational turret mechanic's courses should include one to two weeks of electrical theory as applicable to the tank turrets. Cross-training should be increased in order to partially offset assignment blunders.

- Organizational turret repair manuals should include a chapter on how the turret and the turret components work. Rarely does a newly-trained turret mechanic keep notes from his schooling, yet eventually he needs to refer to something to help him figure out a problem not listed on the troubleshooting charts.

- Extra test sets should be issued at tank battalion/cavalry squadron

level to replace those test sets turned in for calibration or repair.

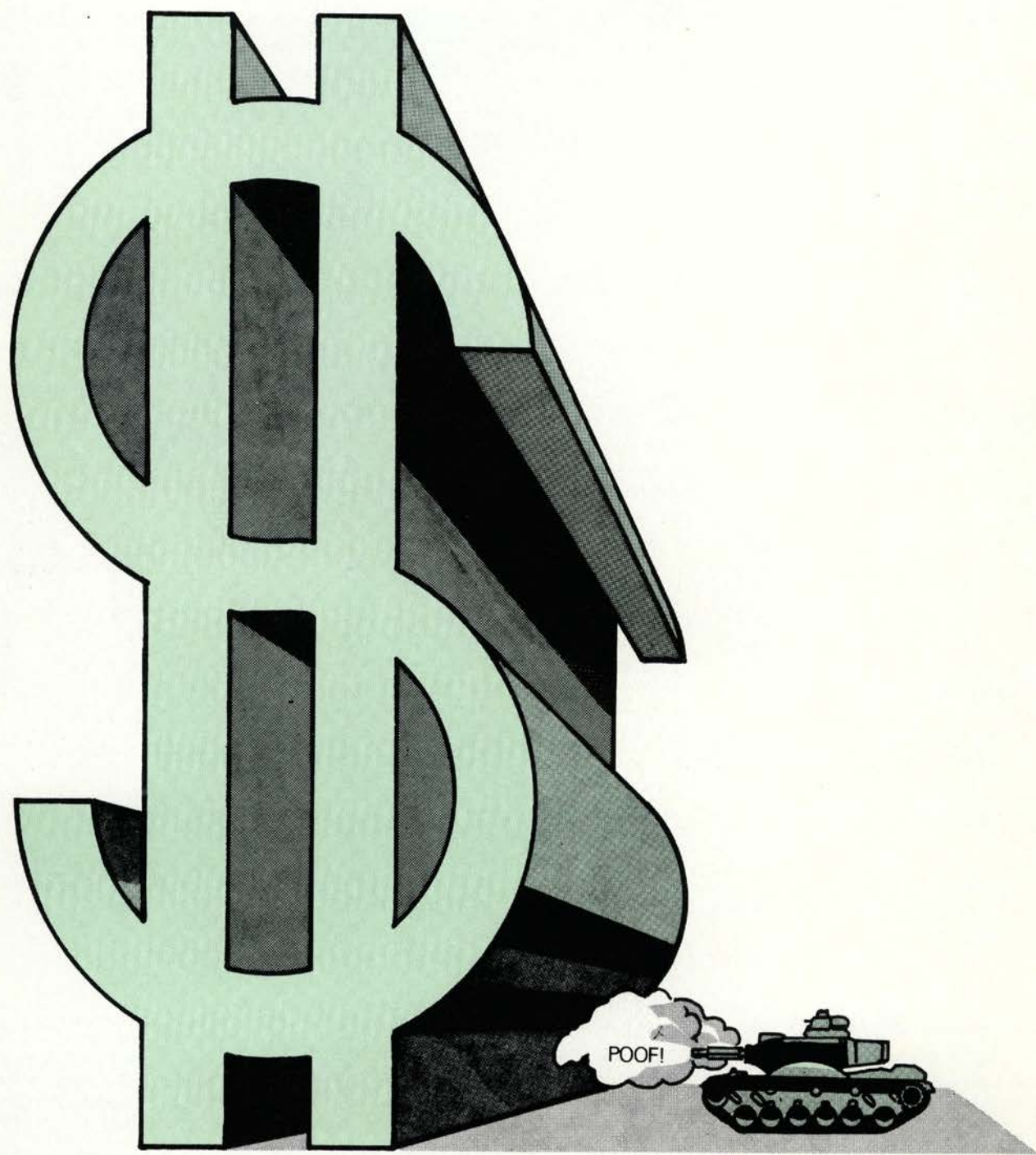
- The rank of the turret mechanic should be raised to E-6 even at company level to encourage personnel to stay in the MOS as a career. Hopefully, hard-earned turret repair experience would not be lost from the maneuver battalion to DS/GS units or to civilian life.

- The creation of a separate turret maintenance section at battalion (organizational) level, such as now exists in missile battalions. This turret maintenance section would be led by an E-7 (MOS 45K), and would control the extra test sets mentioned above, as well as have on hand some test equipment presently found at DS-level. Three turret maintenance teams, each led by an E-5 (MOS 45K), would be assigned to the section and would provide backup support for the company turret mechanics.

Some may say that the suggestions mentioned above are preposterous, yet there are unit commanders facing electronic turrets now, and many more who will face them in the future. All will marvel at the incredible performance of the tanks when the turrets function properly, but will soon learn to dread the day when something goes wrong. Turret maintenance problems of a vastly different nature are upon us, and a failure to take corrective action soon will result in tank units that can move — but not shoot. *Such a tragedy.*



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LESS BANG FOR THE BUCK IN COMBAT VEHICLES

by Colonel Robert E. Butler

THE XM-1 tank procurement cost will exceed one million dollars when it is fielded in 1980. The impact of inflation, current and projected, is vividly demonstrated by the XM-1 tank program since the unit design-to-cost for the tank in fiscal year (FY) 1972 dollars is \$507,000.

During the period 1948 to 1973, the inflationary trend was gradual and, except for 1973, never rose above 6 per cent. In determining the total planned costs for weapon systems, the official OSD guidance until 1969 was to omit allowances for inflation. Thus, even the low rate of inflation tended to make cost overruns the rule rather than the exception. To overcome this problem, Secretary of Defense Melvin R. Laird directed budget planners in

1969 to include allowances for inflation in determining total weapon systems cost. OSD published the first set of inflation indices in FY 70 and they were revised several times between then and FY 74. OSD price forecasts, along with others, understated the degree of inflation, particularly in recent months.

In attempts to assess the impact of inflation, several studies have been conducted by the Department of Defense recently. One study, completed during the fall of 1972, found that the Army did not have an effective mechanism for translating the impact of price changes in the private economy on the proposed Army budget. Another study, conducted in early 1973, concluded that inflation has had a massive impact on the Defense budget. The impact is illustrated by the fact

that although Defense spending increased from \$43.6-billion in FY 54 to \$79-billion in FY 74, inflation has been so extensive that the FY 74 budget was actually 20 per cent below the 1954 level in terms of buying power. Of even greater concern is the fact that while the Defense budget increased by \$28.2-billion during FY 64 to 74, the vast majority of the increase has gone for military pay. Procurement, research, development, test and evaluation, and construction increased only \$1-billion during this period. The Army study also documents cost growth of several generic systems to illustrate that system performance has also taken its toll. For example, the cost of the F-4 fighter in 1972 was \$2,562,338 compared to \$89,000 for the P-47 fighter during World War II, a 2900 per cent increase.

Based on the consumer price index, the 1974 inflation rate was 11.1 per cent, over four times the 2.66 per cent projected for 1974 by OSD. A review of periodicals, government documents and industrial reports covering the past 12 to 15 months quickly shows the reason for this disparity.

Industry in general has experienced

a shortage of materials. Inability of the steel industry to meet demands has forced many companies to alter production plans. The same is true of other major basic raw materials such as aluminum, copper and rubber. These shortages have greatly affected delivery times and the prices paid for the items when delivered. In an at-

tempt to overcome lead time problems brought about by the shortages, many companies doubled inventories of raw materials and components. Increased costs of maintaining these inventories are, of course, passed along to the customer. To insure delivery of equipment, many customers are even willing to accept an escalator clause on orders.

This way, the customers pay the going price at time of shipment rather than at the time of the order. As will be discussed later, the Army has reluctantly become one of the "customers" willing to pay the going price at the time of delivery.

Another major factor which fueled the inflationary fires was the energy

crisis, brought to a head by the oil blockade of the United States by the Organization of Petroleum Exporting Countries. The resulting increase in the price of oil touched off a chain of events which caused price increases in almost all segments of industry. Again, these increases, for the most part, are being passed on to the

customer.

Another factor which normally leads to inflation is increasing wage demands. First year wage increases have risen sharply from 5.8 per cent in 1973 to 9.8 per cent in 1974. Cost of living increases built into recent contracts will drive wage increases up even higher.

The inflationary trends in the overall economy are even more pronounced in the segment of industry which produces combat vehicles. Raw materials such as steel, aluminum, glass and rubber are the mainstay of combat vehicle production. Inflation in these raw materials has exceeded the 11.1 per cent rate for the overall economy. An example of price increases in raw materials was given by a large corporation project manager:

"We are experiencing price increases of a magnitude unheard of just a year ago. For example, recent quotations from vendors show an increase of 81.1 per cent in aluminum forgings. Steel forgings have risen only slightly less—50.6 per cent. Rubber products have increased 43.5 per cent. Overall material costs for tank production have risen approximately 41.1 per cent."

Recent price quotations for a major tracked vehicle bear out this comment. The actual cost of the vehicle in FY 73 was \$306,000. In April 1974, the project price for FY 75 was

\$353,300. In July 1974, a new estimate was received and the projected FY 75 price had risen to \$410,135. This increase strongly supports the comment by another defense industry representative who stated in an interview that combat vehicle prices have risen about 25 per cent during the past year.

The shortage problems experienced by non-defense oriented industry are even more acute with the combat vehicle producers. One primary cause for this is the special requirements for combat vehicles. Many materials must be produced by special processes, which, in most cases, have more rigid specifications and are not used in normal consumer products. One example is the case of steel and aluminum armor plate. This plate must undergo special processing to achieve the hardness and ductility required to provide the ballistic protection necessary for combat vehicles.

Another reason for the greater inflationary trend in the combat vehicle industry is the decrease in foundry sources capable of producing large

armor castings. In 1970, there were four producers of the armor castings required in the production of the *M60A1* tank. By the early part of 1974, that number had been reduced to one, due to two main reasons. First, many foundries could not meet the new requirements specified by the Clean Air Act and, rather than invest the capital required to clean up the old foundries, they shut down. Second, the low rate at which the *M60A1* tank was being produced and the civilian demand for castings made the foundries turn their business to other customers.

Recent procurements of major spare parts for combat vehicles also show that inflation in the combat vehicle industry far exceeds the 11.1 per cent experience of the general economy. The price of *T142* track shoes for the *M60A1* tank was \$49 in FY 72, \$60 in FY 73 and \$120 in FY 74. The FY 74 price increase was experienced even though the bid was made under competition and both companies had produced the track shoes previously. The same trend has been noted in other spare parts as shown in Table I.

TABLE I
COMBAT VEHICLE SPARE PART PRICES

Part	Combat Vehicle	FY 73	FY 74
Road Wheel	M60 tank	\$ 90	\$ 164
Final Drive	M60 tank	1744*	2925
Torsion Bar	M60 tank	74*	90
Shock Absorber	M60 tank	71	83
Sprocket	M60 tank	123	142
Track Shoe (T97E2)	M60 tank	39	62
Transfer Case	M113 APC	930	1225
Heater	M113 APC	136	185
Starter	M88 Recovery Vehicle	453*	716

*Prices shown are from FY 72 contract; parts were not procured in FY 73.

The signs are clear that inflation will have a serious impact on the FY 75 procurement of tracked combat vehicles. Inflation in material costs has caused many vehicle components to double or triple in price. These price increases, along with increased costs of labor, have inflated the FY 75 cost of combat vehicles by 18 to 52 per cent. A review of economic indi-

cators show that inflation will maintain a rapid pace during the remainder of FY 75 and in FY 76. The full impact of "double digit" inflation is now being felt. Current contract negotiations vividly point out the inadequacy of the FY 75 budget to support the tracked combat vehicle programs outlined in the Five Year Defense Program.

Four possible alternatives to counteract inflation in the future are: (1) increase the Defense budget, (2) reallocate funds from other programs, (3) modify current equipment at a lesser cost to maintain up-to-date capability, or (4) reduce the number of systems to be procured. The first alternative would be the best choice for the Army, and the Ford administration has asked that the total obligational authority for Defense be increased to \$104.7-million for FY 76, 17.6 per cent over that authorized for FY 75. The second alternative presents a partial solution by "robbing Peter to pay Paul." A review of priorities must be conducted and a determination made as to which programs can be reduced in order to provide the funds required for the tracked combat vehicle program. Reordering of priorities may prove to be of little real value since the Army already has a priority in effect.

The third alternative is already being used widely, especially for combat vehicles. A major program is underway to product-improve the *M60A1* tank. However, lead times of approximately two years are required after improvements have been developed before retrofit programs can become productive. Thus, programs of this nature offer only a partial counter to inflation.

Alternative four, reducing the number of combat vehicles to be procured, is the least desirable solution for the Army. However, in view of the fact that inflation is having similar impacts on the vast majority of Department of Defense procurements, this alternative could become the rule rather than the exception. In essence, programs may be forced to live within their current fiscal constraints. While such an approach will cause disruption in all but those few exempted programs, it will

not cause massive disruptions such as could be the case under alternative two.

Reducing procurement of new tracked combat vehicles could have a significant impact on the Army's ability to perform its mission. Tank shortages have been well-publicized recently. Reducing procurement will mean keeping older vehicles in the inventory longer, thereby increasing maintenance costs. However, the real danger inherent in alternative four lies in the future. While the reduction in procurement required to stay within the FY 75 budget would have a significant impact on the Army, a prolonged period of reduced procurement of combat vehicles would have a disastrous effect. The case of *M60A1* tank production is an excellent example. In an effort to minimize expenditure of funds but also maintain a production base, production of the *M60A1* tank was significantly reduced in the early 1970s. As a result of the recent requirement to build up the Israeli Defense Force tank strength and concurrently satisfy US Army and US Marine Corps requirements, the production rate had to be greatly increased. As indicated previously, sources for armor castings had been reduced significantly and the capability to build up the production rate quickly was seriously handicapped. Although procurement of combat vehicles by foreign countries is expected to keep facilities producing at or near capacity levels for the immediate future for the *M60A1* tank and *M113A1* APC, production capability for other combat vehicles could be jeopardized by reductions in procurement to satisfy US Army requirements.

Reduction in the number of combat vehicles is not an acceptable means of dealing with inflation on a long term basis. Several measures should be taken to curb the effects of inflation. First, the US Army must actively support measures taken to curb inflation in the general economy. High level emphasis is required. Second, more realistic indices must be used in the preparation of the Army budget. A recent directive from the Assistant Secretary of Defense for Financial Management is a step in the right

direction. The directive permits the services to develop their own escalation rates based on individual program factors such as contract provisions, contractor's wage plans and labor agreements, and the cost of specific materials used in the program. The directive also provides higher escalation indices than previously projected for general application. Third, the Army must continue its review of procurement programs and fully support those programs which contribute most to its ability to perform its mission. At the same time, stringent measures must be taken to insure that performance specifications for its equipment are not excessive. Extreme care must be taken to exclude "nice to have" features. Fourth, the Army's force structure must be reviewed critically to insure that only necessary equipment is procured. Last, the Army must be prepared to support its case in detail for a larger share of the Defense budget when it is required.

Inflation is expected to continue to have a serious impact on procurement of combat vehicles. Only through a concerted effort will the Army be able to support the combat vehicle procurement programs required to perform its mission.



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MERCENARIES:

Professionals or Outlaws?

by Captain David L. Weber



MERCENARIES have existed since employed by the Egyptians in 660 BC, and then as now are primarily soldiers serving for hire in foreign armies. They are distinguished from those who perform military service for their own state either as conscripts or volunteers and they can be further differentiated from soldiers of fortune who fight for adventure's sake — with or without pay. The title is often wrongly used to discern between the professionals and the conscripts of a country's military forces. The true mercenary is the fighting man who hires himself out to fight for a foreign country in a quarrel in which he has no interest save his regular pay.

The earliest record of the large-scale use of mercenaries was in the reign of Psammetichus I, King of Egypt, 660-609 BC. Beset by the forces of the Assyrians and the Ethiopians, and with many internal dissensions as well, Psammetichus took the advice of traveling Greek merchants and hired a unit of Greek hoplites (heavy infantry). The likes of these disciplined forces had never before been seen on an eastern battlefield, and Psammetichus became the undisputed master of Egypt. Under Xenophon, no less than 10,000 Greek mercenaries fought for the Persians in their civil war. Carthaginians, who rarely took up arms except when their cities were directly endangered, depended wholly upon mercenary armies during the Second Punic War. The great military commander Hannibal commanded troops of eight nationalities in the campaign that brought Rome to the brink of disaster. As with the people of Carthage, the wealthy Italian city-states of the Middle Ages found it easier to hire bands of *condottiere* (mercenaries) than to induce their citizens to bear arms. Armies changed sides frequently during this period, following the call of the highest bidder. Although fewer in numbers, mercenary forces are found still today, from the famous Foreign Legion of France to the infamous 5th Commando of the Congo.



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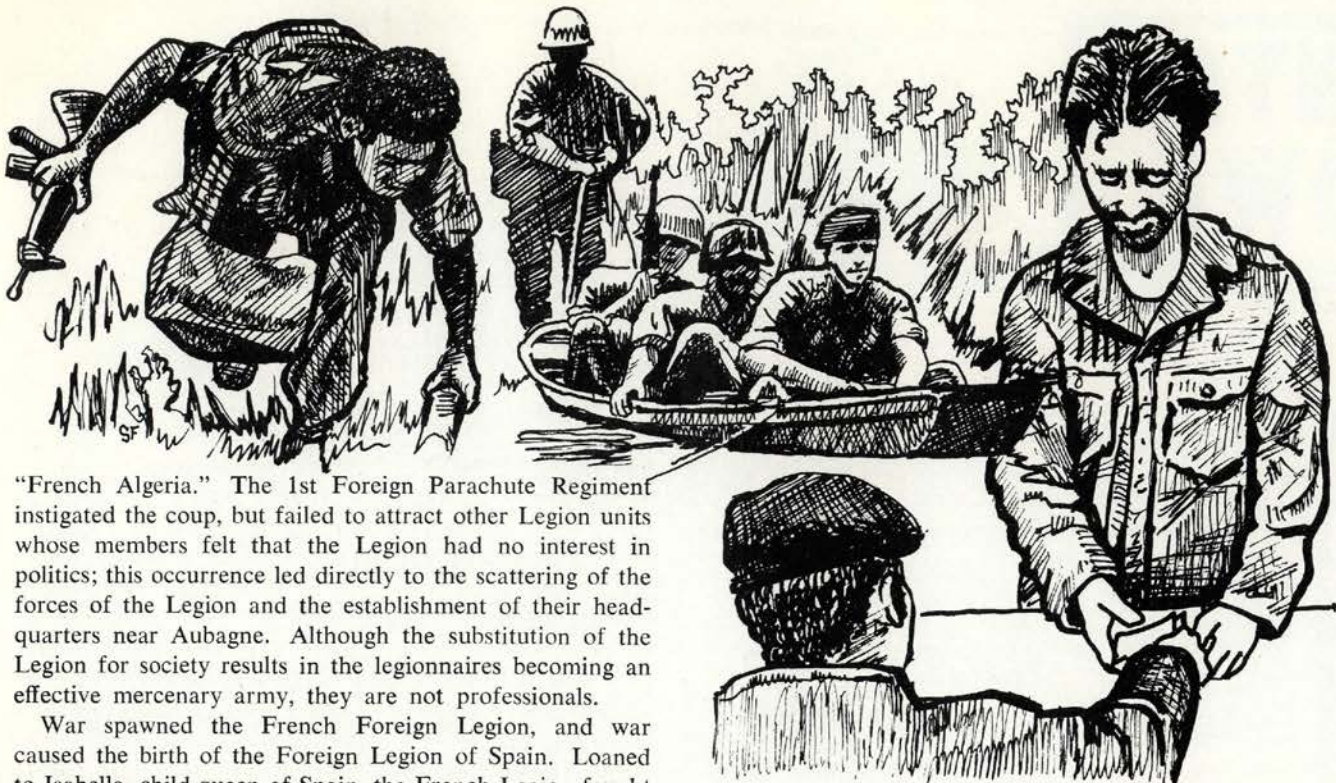


To effectively discuss the presence or absence of professionalism in the contemporary mercenary, I feel that one must have some basic idea of professionalism. This nebulous characteristic of the military man can be given many meanings. Harold Laswell states that the skill of the military profession is the management of violence. I believe that this applies to officers and unit leaders. The majority of enlisted men filling the ranks are usually trained more along the lines of the selective application of violence. Hence, one can see the skills of a soldier as a vocation but those of a leader as a profession. General Sir John Hackett stated in his work, *The Profession of Arms*, that "the function of the profession of arms is the ordered application of force in the resolution of a social problem, at the instance of a proper authority." He further states that the functional efficiency of the military group in the discharge of its main purpose positively depends upon the military virtues of courage, resolution and subordination of self.

The distinguishing characteristics of a professional as an individual following a special type of vocation are his expertise and responsibility, combined with his unit's corporateness. Expertise is the possession of a special knowledge or skill, without which a man could not succeed in his profession. A soldier must know his business — violence. Yet the knowledge of how to wage warfare is not enough. A man must have a sense of personal responsibility to serve with a devotion to his skill that causes him to stand by his fellow combatants and his ultimate mistress, society. The technical love for his craft and the sense of social obligation to utilize this craft for the benefit of society constitute professional motivation. Finally, his organization must possess corporateness, a consciousness as a public but bureaucratic group apart from laymen. As a group, they alone are responsible for the military security of society to the exclusion of all other ends.

How does military professionalism apply to the mercenaries of today? Contemporary mercenary armies are made up of men from many nations and many backgrounds. The most famous of these units is the immortal *Regiments Etrangers*, the Foreign Legion of France. Headquartered at Camp de le Demande, near Aubagne in the south of France, the Legion has had a colorful history since its inception in 1831. It originally consisted of mercenaries from Belgium, Germany, Italy and Poland, joined by the jobless masses of France. Fighting in the Carlist Civil War to aid the Spanish Royalists, the Legion's deserters formed the Spanish Foreign Legion, as discussed later. Most of the legionnaires who fought at Dien Bien Phu in French Indochina were Wehrmacht soldiers from Nazi Germany who enlisted directly from prisoner of war camps (many were from the hated SS units and dared not return to post-war Germany).

The ills of society bred the men of the Legion; its reputation as a haven for refugees, ex-revolutionaries, and petty criminals earned the unit the title of the Legion of the Damned. Although this was not always the case, since over 44,000 foreigners from 51 countries joined to fight in World War I and over 60,000 in World War II, an enlistee in the Foreign Legion usually is running from someone or something. Only required to give *some* name, these men receive their basic military expertise during six months training in Corsica, and polish it in places such as Jibouti in French Somaliland, Madagascar and Nururoa, the French atomic test atoll in the Pacific. They become thoroughly skilled at warfare. The *Regiments Etrangers* also has an identity and corporateness that helps mold men of many nationalities into one unit. Its men, however, fight for the Legion, not for France. Here I feel is where the professionalism falls down. For example, when the French government decided to give independence to Algeria in 1962, units of the Foreign Legion revolted to insure a



"French Algeria." The 1st Foreign Parachute Regiment instigated the coup, but failed to attract other Legion units whose members felt that the Legion had no interest in politics; this occurrence led directly to the scattering of the forces of the Legion and the establishment of their headquarters near Aubagne. Although the substitution of the Legion for society results in the legionnaires becoming an effective mercenary army, they are not professionals.

War spawned the French Foreign Legion, and war caused the birth of the Foreign Legion of Spain. Loaned to Isabella, child-queen of Spain, the French Legion fought in the Spanish Civil War three and one-half years without pay, foraging off of the Spanish countryside. Promise of the basics of food and pay led many of the legionnaires to desert to the Carlists, forming another Foreign Legion. The one and only time the two units met at Barbastro, Spain, they almost destroyed each other. Out of the remaining men, Spain rebuilt her Foreign Legion. Unlike the Foreign Legion of France, the *Tercio Extranjero* of Spain is composed mostly of Spanish nationals, many of whom join the Legion rather than be drafted into the regular army. Other recruits are motivated by the lure of adventure, haunting civil records, or other needs to escape. Unlike the French Foreign Legion, however, the Spanish have not created a haven for criminals. Upon identification as being wanted by any national authority for criminal violations, the fugitive is surrendered for appropriate judicial handling. Located around Gibraltar or in the Sahara, the four regiments that are maintained gain the needed expertise in warfare. Led mostly by regular Spanish army officers, the Foreign Legion of Spain comes the closest of all mercenary armies to being a professional unit since the high percentage of Spanish citizens within its ranks gives it some measure of allegiance to the society it serves. Only the foreign mercenaries filling the gap, fighting for adventure, loot, or freedom, alter its profile.

Of the traditional national contingents only the Gurkha battalions from the sovereign state of Nepal could be considered significant mercenary units today. When India became independent in 1947, eight of the Gurkha battalions provided to the British Indian Army by the Maharajah of Nepal were transferred to the British service and have remained since then. Recruited from a poor, agrarian country, these men find an income and a respectable position in life within the service of the Gurkha battalions, building a world-wide reputation for being faithful and skillful fighters. Here, as in the Foreign Legion of

France, the necessary individual expertise is gained with training and experience. Unit identification and reputation give the Nepalese Gurkha warriors the corporateness a military unit requires. Motivation is not due to the desire to serve a colonial mother country, but is the result of the need for personal gain and position. This in no way degrades the Gurkhas as soldiers; like the only remnant of the thousands of medieval Swiss mercenaries, the Papal Guard of the Vatican, these men are good. Again, the responsiveness of the Gurkha fighter is to his unit and his reputation as a Gurkha rather than the wishes of the society of the British empire.

Contemporary mercenary armies other than the above long established units have also sprung from the common womb of their existence, war. These, however, had no history or pride with which to substitute a responsiveness to society, and soon disbanded. The largest attraction for mercenaries in recent years, the Nigerian Civil War of 1968, gave rise to the formation of the 4th Commando Brigade. Led by mercenary officers and non-commissioned officers, its soldiers were attracted by wealth and the excitement of war. Starting at a minimum base pay of \$1,700 per month, they gave their allegiance to the money offered by the secessionist state of Biafra and its leader Ojukwu.

The men had personal expertise. Their commander, for example, was one Rolf Steiner, ex-Hitler Youth, ex-French Legionnaire and ex-Algerian OAS. Many of the mercenaries had fought before, and when engaged were very effective against the untried Nigerian forces due to the mercenaries' wealth of military experience, including guerrilla warfare.

However, they lacked corporateness, being the pampered pinions of Ojukwu trying to lead or accompany the rebel Biafrans with whom they had no common bond. The searing absence of any responsibility to the society they

were serving came out when the going got rough. Disliking physical involvement in a battle as opposed to only directing the operations of insurgent forces, these soldiers of fortune showed their true colors when the tide turned against Biafra. Taking their money and loot, the mercenaries abandoned the secessionists. The 4th Commando Brigade could hardly be considered professional.

In the period just prior to Biafra's try at independence, the Zambesi Club of London was doing a thriving business . . . but not as a bar. A traditional gathering place for British colonial troops, this establishment has also been the recruitment center for many mercenary forces. Here the "Dangerous Dozen" were attracted by the promise of \$2,800 per month to fly jets for Saudi Arabia. Mercenary advisors to the government of Yemen were drawn by the call of Middle Eastern adventure and \$1,000 per month. Admitting themselves that the driving factors were emotional satisfaction, the plunder of captured property, and a guaranteed salary of \$800 per month, mercenaries joined the Congolese 5th Commandos under Major "Mad Mike" Hoare.

From the efforts at London, Major Hoare recruited many junkies, drunks, hobos, former Nazis and ex-convicts to fill the ranks. Some men who joined were well-born and well-educated, such as Sergeant Patrick O'Malley, British and a graduate of Oxford. Some even joined with the idea of helping the rebellious Congolese establish a free state for themselves, such as Lieutenant Garry Wilson, a 25-year-old British graduate of Sandhurst who spent two years with the Royal Horse Guards on Cyprus. Most of the volunteers, though, were less than socially desirable.

In the Congo, President Joseph D. Mobutu hired 400 more mercenaries, mostly Rhodesians and South Africans, to flesh out the 5th Commandos. He also hired Cuban pilots to fly the planes of the Congolese Air Force in support of the mercenaries. Men such as Roy Whitehead (Rhodesian garage mechanic), Joe Wepener (Rhodesian policeman), Michael May and Butch Schoermann (South African adventurers), Barry Hobbs (Canadian ex-soldier), and an unknown man called "Mike" (Belgian lawyer) joined the "rabbit hunt" against rebels who were no threat to them.

These undisciplined hirelings successfully put down the revolt of the Simba and the Jeunesse forces, looting and killing all across the Congo. Their leader, Major Hoare, said, "I don't know what effect these men have upon the enemy, but, by God, they terrify me." Their expertise, though ragged, paid off — maybe too well. Their inherent lack of social responsibility soon sprang up. When President Mobutu tried to disband the mercenary units he no longer needed, the lure of more money, more loot, and further adventure resulted in the majority of the mercenaries switching sides in the struggle. Supporting Moise Tshombe, the ousted leader of the rebellion, the mercenaries under a Frenchman, Colonel Bob Denard, and a Belgian, Major Jean "Black Jack" Schramme, revolted. The mercenaries again showed their weaknesses when 15,000 Congolese army troops trapped 123 men of the 5th Commando Brigade and 950 native gendarmes in Katanga Province, the Congo. The "terrible ones" wanted out. Only the action of a mercenary relief column from

Angola under a former Yemeni advisor, Colonel Bob Devaro, saved the 5th Commandos from annihilation at the hands of the enraged Congolese soldiers. As in the case of the Biafran 4th Commandos, the Congolese 5th Commandos were not professionals.

Accepting the premise that military professionalism depends on the level of an individual's martial expertise and responsibility to society, one can realize that the mercenary, though usually an expert at the art of killing, fails to achieve a professional status. Fighting for no reason save plunder, reward, or personal satisfaction, the mercenary is not satisfied by being in the service of society. Many of the recruits either cannot or choose not to adjust to the burden of being a member of society, with a responsibility to support its aims and policies. The military virtues put forth by General Sir John Hackett are virtues found in every walk of life, but are nonetheless virtues for being jewels set in blood and iron. Functionally indispensable, the whole of military professionalism is set upon a deliberate attempt to foster these virtues since they contribute significantly to military efficiency. The military institution is a persistent social form that induces rational men to devote their adult lives to it. The difficulty in identifying the mercenary with the professional soldier lies in relating reasons of a temporary and often dubious worth with those of a professional's constant validity. Morris Janowitz defines a constabulary concept of military force, wherein the application of violence is for the containment of violence. This may be the result of the professional military, engaging in timely warfare to support the desires and position of constituted authorities and thereby avoid or lessen general war. The mercenary forces cannot fulfill this function. As the legionnaires of France and the Gurkhas of Nepal demonstrate, a sense of responsibility may be a prior condition of allegiance to authority. They only substitute their leaders and their units for society to gain an allegiance, and in the end remain mercenaries.

S. P. Huntington pointed out that financial remuneration cannot be the primary aim of the professional man in the capacity of a professional man. A soldier is not a mercenary who transfers his services wherever they are best rewarded, for the singular employment of his military expertise promiscuously for his own advantage would wreck the fabric of society.



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TANK INNOVATIONS

by Joseph Williams



THE modern tank in essence is a subtle embodiment of some of the most formidable and sweeping innovations of war that have occurred in history. Its role and combat characteristics are traceable to the elements of mass, shock and momentum so well displayed by the phalanx, the chariot, cavalry charges and knights in armor. Since its crude emergence during World War I, the tank has progressively grown in prowess, mainly because there is no other system which expresses so well those fundamental fighting qualities which are most essential in combat.

In addition to fulfilling a tactical need, its rise into prominence must also be credited to a steady influx of national and world-wide technical contributions. Most tank innovations are the direct byproduct of advancing military research and technology. Some are the result of commercial developments, and a few are singularly attributable to the independent and imaginative resourcefulness of individuals.

The history of tank evolution glitters with many remarkable achievements. Only a few are described here. These have been confined to those innovations which have had an unusual impact on tank design and which, hopefully, may answer a few of the many questions posed by inquisitive minds within our armored forces.

INNOVATIONS

Rotating Gun Turret — Successfully utilized by the Navy, the rotating armored gun turret was a natural addition to the tank. Its advantages ideally complemented the tank role. It permitted 360-degree traverse, use of a single main weapon and excellent integration within its large turret ring of men, weapons, ammunition and fire control.

Road Wheel Motion — Introduction of a spring media to track-laying vehicle suspension systems and the realization of progressively greater road wheel displacement through leaf, volute, helical, torsion and hydropneumatic spring systems have promoted higher power-to-weight ratios and made possible commensurately greater cross-country speeds, thus providing greatly increased tactical mobility and survivability.

Rubber Bushed Pin Track — Although this US development originated nearly a half-century ago there have been no subsequent contrivances to equal its effectiveness. Rubber bushings are simple, compact and lightweight. Their resilient characteristics offer absolute sealing and provide exceptional durability.

Engines — Developments in spark ignition and compression ignition engines have been subtle, yet impressive. Definite gains were achieved in the general acceptance of the Diesel fueled compression ignition engine. The variable compression-ratio piston is now a working reality. It produces more than one gross horsepower per cubic inch of engine displacement. Other complementary Diesel engine developments include: turbocompounding, variable area turbochargers and greatly improved fuel injection systems. It is expected that even far greater benefits, particularly in the high power-to-weight ratios, will be made through the introduction of light, compact, multi-fuel turbines.

Power Transfer Systems — Outstanding progress has been made since the arduous, exhaustive and erratic manipulation of mechanical clutches, gears and steering levers of past track-laying vehicles. Propulsive as well as steering developments have given the tank continuing vigor and growth. Noteworthy among the former are the sliding gear, constant mesh hydramatic and torquematic transmissions, while the more popular steering innovations include the evolution from simple differential to clutch brake, to controlled differential and to clutch epicyclic arrangements.

A major milestone in power transfer development was achieved during World War II with introduction of the Merritt-Brown integrated triple differential cross-drive transmission by the United Kingdom. It combined the propulsive gear ranges with the controlled differential steering units into a single compact package. The US further improved this approach by adding torque converter, hydraulic clutch controls and brakes to the Model CD-850 transmission late in the 1940s.

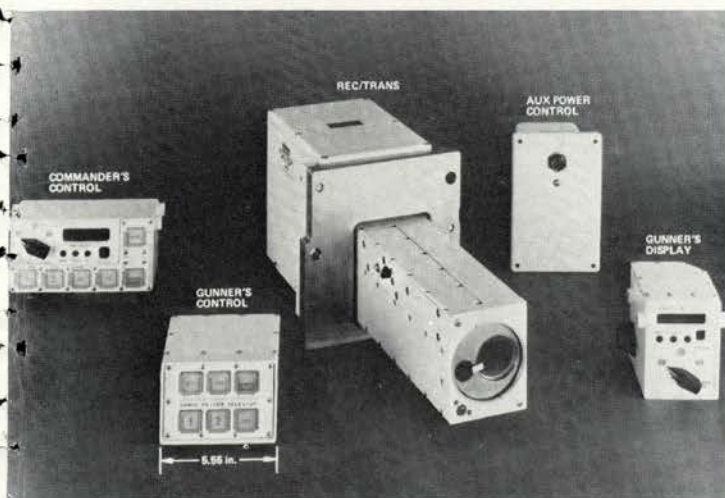
Foremost of modern transmissions now being introduced are the fully integrated (clutch, propulsive drive, steering

and brakes) hydrokinetic and the hydromechanical versions. The former is distinguished by a torque-multiplying hydraulic converter which shifts in lock-up mode for greater power transfer efficiency. The latter features hydrostatic units for the propulsion and steering mode. Both incorporate the advanced, highly maneuverable, infinitely variable, speed sensitive, hydrostatically-controlled differential steering units which in essence provide, without slippage, smooth, infinitely-variable turns.

Gun Stabilization — The advantages of firing on the move achieved by gun/sight stabilization in elevation, traverse and even roll have been appreciated for many years. Crude stabilization systems were used in World War II. Aided by high road-wheel bounce and optimum, dynamic mass/spring relationship, advancing technology has now made possible control and stabilization systems which instantly respond and provide phenomenal accuracy while maneuvering at high speed over irregular terrain.

Oscillating Gun Turret — This French concept is one of the more ingenious turret arrangements ever conceived. Its many virtues, such as significantly reduced turret height due to the fixed relationship between gun and turret roof, elimination of gun shield providing smooth frontal shape with greatly enhanced ballistics protection, and simplification of fire control and automatic loading mechanism have not been fully exploited primarily because of the inherently greater armor weight imposed by the unavoidable overlap between the oscillating body and the rotatable yoke.

Range Finder — There are many errors which influence gun firing accuracy. One of the main sources of error has been visual range estimation. In the process of finding an acceptable solution, stadia and radar-type range finders were studied. It was not until the US Army incorporated a 60-inch base optical stereoscopic range finder in the experimental T42 tank (whose turret was adopted for the M47 tank) that a major advancement in tank gunnery was achieved. Since then, exploitation of range finder technology has culminated in the current use of optically-aimed, fast and extremely accurate lasers.



AN/VVS-1 Laser Rangefinder

Elliptical Hull — The M103, M48 and M60-series of tanks are distinguished by a high obliquity quasi-elliptical hull. This unique configuration provides maximum structural rigidity, volume and ballistic protection for a minimum of armor weight. Its rounded underbelly offers excellent protection against land mines.



The Swedish Strv 103B (S-Tank) employs a radical, turrettless design.

Ease of Maintenance — As the result of bitter World War II experience, the US Army placed great emphasis on ease of maintenance of high mortality sub-assemblies during the development of its first post-war combat vehicle, model M41 light tank. Many ease of maintenance features, including quick removable gun tube and power package, have since been incorporated on follow-on generations of vehicles.

Swedish "S" Tank — Bold and ahead of its time, this concept lends itself particularly well to future technology. Its turrettless configuration, three-man crew, automatic loading and suspension controlled gun may presage the general direction of future fighting vehicles.

Main Armament and Kinetic Energy Warheads — Tank weapon progression has occurred in steady, undramatic stages from the machine gun to the full caliber shot to hypervelocity penetrators. Perhaps the greatest advancements occurred with the introduction of spin-stabilized and later fin-stabilized high energy concentration, sub-caliber projectiles. Simplicity, reliability, low cost and contempt for countermeasures continue to make the gun preferred tank armament.

Shaped Charge Munitions — While the shaped charge or High-Explosive Antitank (HEAT) munition is not considered a tank innovation, its reputed effectiveness in killing tanks justifies discussion. Contrary to popular belief, shaped charges, the warhead of all antitank guided weap-

ons, do not kill tanks. The relatively low mass, super velocity jet must penetrate the armor and then come in contact with combustibles (ammunition and fuel) in order to disable a tank. Unlike an armor-piercing high-explosive (APHE) warhead the small-diameter, high-energy jet mass does not, of itself, explode inside the armor. Thus, devoid of combustibles, a tank can receive numerous penetrations without being destroyed.

Unlike current tanks which randomly place ammunition, fuel and other combustibles in fighting compartments, future tanks are expected to isolate, compartmentalize, or even neutralize these explosive elements so that the sting of a shaped charge will be not much more lethal than the effects of an armor-piercing secondary armament projectile.

Ballistic Computer — To achieve a quick, high first-round hit probability, particularly at long ranges or while moving, collective control and resolution of the many factors which influence gun accuracy is essential. This is a primary function of the ballistic computer system. These units have grown in sophistication since the simple mechanical devices, but their spectacular performance in the stationary and moving vehicle modes and the fact that they effectively complement the imprecise human link during periods of combat stress, offer a strong argument for their acceptance.

Night Sights — Electronic technology has ushered in a series of night vision devices since the advent of illuminating aerial flares. Among the most striking developments have been target acquisition through the medium of visible light searchlights, xenon searchlight (both visible and active infrared light), low light-level image intensification and, most recently, passive thermal infrared imaging.

Soviet Gun Turrets — Low, sleek and with excellent obliquities and small gun shield, the Soviet tank turret approaches the ultimate in conventional design. The US experimental T95 tank turret developed during the mid-1950s exhibited these same characteristics. This appealing configuration is enhanced by greatly reducing the 10-degree gun depression, use of austere fire control and disregarding the requirement to remove the gun mount from the gun shield opening.

Compact Turret — Due to their circular configuration, conventional gun turrets require massive frontal thicknesses to meet frontal arc protection requirements. And because turrets should be statically balanced about their axis of rotation, a large bustle is necessary to counter-balance this effect as well as the mass effect due to the main armament. All this leads to massive structures.

The M60A2 tank turret circumvents these problems. Two uniformly thick parallel walls, approximately one meter apart, placed over a shallow, oblique dome, enclose the gun, mount and centrally located commander. This deliberate design, although lacking cosmetic appeal, provides a smaller frontal target area and greater average

all-around armor protection than all other contemporary world tank turrets.

FUTURE POSSIBILITIES

Having reviewed some of the more prominent tank innovations, a look to the future is in order. Actually the future of the tank sparkles with more impressive changes than its past. Looming in the not too distant horizon are these tantalizing tank possibilities.

- Non-explosive, liquid bi-propellant
- Non-burning, heat resistant fuel
- Compartmentalization of ammunition
- Compartmented separation of crew, weapon/ammunition and power train elements
- High power-to-weight ratio as a means of evading direct hits
- High-performance hydropneumatic suspensions
- Improved weaponry which will knock out ground as well as aerial targets
- Target-seeking weapons systems
- Heavily protected, encapsulated crew compartment
- Active armor
- A two-tank system: one sophisticated for low volume production, the other austere, low weight and low cost, produced in large numbers

And beyond this, the tank as we know it must and will change its priorities, as well as its form, in order to avoid obsolescence and retain its preeminence. The stereotyped tank might be transformed into a low, invulnerable, turretless gun-tank, firing either vertically or horizontally-launched guided weapons; or it might be an arrangement featuring three separate compartments: armored crew compartment, engine compartment, and remote controlled weapons station. Even a hybrid fighting vehicle combining the qualities of a tank with those of an armored MICV is a possibility. US technology and creative skill is here; only development and experimental funds are needed.



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A Battlefield of Seconds

by Lieutenant Colonel (P) Jack Mullen

While serving as a division staff officer I was privileged to hear generals discuss "battle captains" — the real managers of battle. They were generally cast as battalion, brigade or task force commanders who were locked in mortal combat — directly in touch with the battle. The following is a comment on the "battle lieutenant" who will be managing a small piece of that action.

This "battle lieutenant" is out killing tanks. He manages scouts and attack helicopters from the cockpit of a scout helicopter. He deals in seconds as he matches wit and combat power with an enemy combined arms commander supported with the best array of weaponry the 20th century has to offer.

The analysts have told him his survivability is measured in "exposure time" — time he is exposed to nine-foot tall weapons systems alleged to be behind every tree. The "battle lieutenant" knows better. He knows that each system he faces has both softness and vulnerability and each individual weapon needs precious seconds as it is brought to bear. He sees these systems directed in terms of the enemy's doctrine, tactics and techniques for employment and knows how many seconds he can afford to be exposed, how many seconds before he must destroy, suppress or spoof these systems.

(ATTENTION ARMY TRAINING MANAGER: ARE YOU TEACHING HIM? I've met a few who haven't been told.) He sees enemy weapon systems in his mind's eye in terms of software and hardware engagement times and ranges. (ISN'T THAT RIGHT, TRAINING MANAGER?)

He knows the heat-seeking missile can be spoofed by ejection of a flare-type heat source away from his craft. (DEVELOPER: DOES HE HAVE IT YET?) He knows that from the split-second he clears the terrain mask, he has _____seconds of exposure time available before he can expect to be hit by a heat-seeking missile. (ANALYST: PLEASE FILL IN BLANK). We need to know the time so the "battle lieutenant" can start popping his heat-seeker spoofers at the optimum time and interval in seconds after he clears the masking terrain.

What of the radar directed missile? The "battle lieutenant" knows that a radar warning device can be placed in his field of vision which will tell him when he is seen and engaged by a radar-directed missile. If we have told him how many seconds he is likely to have after a surface-to-air missile is on the way, he can decide whether to

recover immediately behind the mask or send out chaff and continue to guide the TOW. (DEVELOPER AND ANALYST: PLEASE REPORT YOUR PROGRESS ON CHAFF DISPENSERS FOR HELICOPTERS AND ENGAGEMENT TIME CURVES FOR RADAR MISSILES).

As we pause to change paragraphs, I hear a hysterical screaming in the background from several familiar voices. "The ZSU 23, the ZSU 23, my goodness, the ZSU 23!!!" Our reply . . . how many per acre will we find on the battlefield? How many with a tank company? May we hope that the "battle captain" has engaged the tank force with long range artillery and TAC air? Is it possible that some of the radar antennae have holes in them? Our "battle lieutenant" can hope he is not the first distraction the enemy has had today, but can't be sure. That is why he isn't alone . . . and why the attack helicopter isn't alone on this fragment of the battlefield. There is a team there, moving at speeds from 0 to 180 knots, in new Army terms — overwatching each other. (FIRE AND MANEUVER: COVER ME, SAM, WHILE I RUN FOR THAT LOG!) It's a lot faster now and it's happening over a hundred or so acres rather than a patch of ground football field-size. The teammates don't talk much. They know each other. They use set plays, wave, gesture, motion or maneuver to signal intent or acknowledgement. They know ZSU 23 might be out there and if the artillery hasn't done it first they are going to kill the first one that gets in the way.

How many in the team? What mix of scouts and guns? Who has the tank killer missile and who has weapons for supporting fires? (TACTICIANS: IT'S TIME TO STOP THINKING "ONE-ON-ONE" TOW/COBRA VS TANK. IT'S TIME TO INTEGRATE SUPPORTING FIRES INTO THE SCHEME OF MANEUVER OF THE MANEUVERING TANK-KILLING ATTACK HELICOPTER. SOME OF THOSE SUPPORTING FIRES ARE NEEDED BY THE "BATTLE LIEUTENANT" IN HIS TEAM, SOME AVAILABLE AT HIS CALL.)

Let's watch him for a few seconds — a few tank-killing seconds. He is moving deployed in the nap-of-the-earth to engage an attacking enemy armored force. He has been given a small slice of the field of strife. He looks it over . . . fairly quiet. In a few moments, a highly intense, frenzied action is going to take place out there and be over in seconds.

A decision, a strike, a regrouping. He moves to advantage, selects primary and alternate targets and areas to smoke or suppress by fire. Now begins the precise management of seconds. (A sweep second hand controlled by a single button on the collective could help manage these seconds). HE, smoke, and flechettes go on the woodline to the left . . . running fire . . . attack helicopter . . . from mask to mask. The detonations signal another attack helicopter to engage a selected tank . . . today with a TOW . . . the pilot is counting seconds as he moves right keeping the tank in view but masking from the woods to the left. A second attack helicopter is guiding a TOW to a tank to the right and at a greater range. — seconds pass . . . each exposed ship fires a sequence of flares designed to divert heat-seeking missiles. Both pilots note they are being stroked by surveillance radars. Number two needs 10 seconds to complete his tank kill . . . radar

warning says a SAM missile is on the way. He triggers a chaff dispensing device and selects a post-kill withdrawal route to terrain mask. The "battle lieutenant" has been placing artillery fire on preplanned concentrations designed to isolate his slice of the battlefield; a combination of smoke and HE has separated two doomed tanks from the watchful eyes and comforting cover of their supporting infantry and air defense systems. He has directed attack helicopter suppressive fire on likely locations for the ZSU 23 or other ADA devices. It all happened at once. It is over in seconds, the team struck, killed and is gone. The only signatures remaining are two burning tanks and several barrages of enemy artillery probing out the area just vacated by our "battle lieutenant" and his helicopter-mounted tank-killing team.

Where do we find men who will take for granted that they can think, fight, and coordinate at a tempo sufficient to defeat 20th Century technology on the battlefield? They came from ancient stock. Their ancestors were the first to defeat crossbows, gunpowder, tanks and aircraft when weaker, slower thinkers lay supine watching the capture of their unburned wheat fields. These "battle lieutenants" are here among us now. They are even now seeking ways to open doors and windows into the enemy rear areas . . . push tunnels through the sophisticated area called "no man's air." They need some tools. Given the information, training and equipment needed to exploit the weaknesses of opposing systems and provided with the mobility differential of a zero ground pressure vehicle, the "battle lieutenant" can survive to win on the battlefield. Survivability remains the product of combined arms coordination. Survivability potential will be developed through team training which facilitates the management of seconds on the battlefield . . . seconds needed to identify, isolate, and destroy the enemy . . . seconds denied the enemy as he tries to bring his supporting systems to bear . . . time telescoped so tightly that decisions are sought and achieved at a tempo so rapid and coordinated so precisely that enemy response is too late.

The Army training manager has work to do. The systems analysts will continue to be busy. Tacticians must refuse to accept invisible walls setting off "no man's air." The technical developer must provide the tools to open doors and windows in those walls.

The "battle lieutenants" are already in the wings, waiting for a clear, not uncertain, call to prepare for battle.



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Team-Level Tactical Decision Making



by Major Ralph G. Rosenberg

THE dynamics of the modern battlefield, as partially demonstrated by the October War, have dictated a change in tactical doctrine for the tank/mechanized infantry team. Major General Donn A. Starry's "The Commander's Hatch" in the May-June 1974 issue of *ARMOR* spelled out the following three techniques of movement to contact that a team commander can select, based on his assessment of the enemy threat. These techniques emphasize the importance of cover and concealment and the need for overwatching elements and suppressive fire to support maneuver.

ASSESSMENT OF THE THREAT MOVEMENT TECHNIQUE

Contact is not likely	Traveling
Contact is possible	Traveling overwatch
Contact is expected	Bounding overwatch

A considerable effort has been expended at Forts Knox, Benning, Sill and elsewhere in developing these movement techniques for the combined arms team. The underlying assumption for this evolving tactical doctrine is that the team commander has adequate intelligence-information to make the correct decision. *Does he?* If the team commander errs and selects traveling when contact is expected,

his unit may become decisively engaged before adequate direct and indirect fire support can be provided. Conversely, if he selects the much slower technique of bounding overwatch when the chances of contact are minimal, he may waste valuable time. The movement-to-contact is a means in itself of acquiring more information, so it is possible that good intelligence will not always be available at the beginning of the operation.

The three movement-to-contact techniques can be defined precisely, but the meaning of the terms *not likely*, *possible*, and *expected* probably will vary from one team commander to the next. *Should a standard criteria for assessing the threat be included in training literature?* It may not be possible to arrive at definitions that would be applicable to all tactical decisions.

From the intelligence standpoint, the team commander can make correct tactical decisions if two conditions are met: first, he receives timely, accurate information about the enemy's capabilities and intentions as they pertain to the team; and second, the commander has sufficient knowledge about the enemy to interpret the current data he receives. The education of the team commander on the enemy threat is the easier of the two conditions to meet.

THREAT EDUCATION

The team commander needs to know the organization, tactics, weapons, equipment and vulnerabilities of foreign armies as well as he knows the organization and capabilities of his own battalion. This information needs to be presented to the company commander in a manner that allows him to grasp quickly the important characteristics of the enemy force. Giving him a SECRET publication on the Soviet Ground Forces just will not do! Clearly, the battalion S2 has certain responsibilities in this threat education process; but more important, the division G2 and higher-level intelligence personnel have a stake in this important task. Simple, easy to read unclassified publications and threat briefing teams are two resources that fall under the jurisdiction of higher level staff officers.

The key to threat education for team-level personnel is to present information based on the needs of the consumer — company grade officers, non-commissioned officers and junior enlisted men. For example, the direct fire capabilities of a Soviet motorized rifle battalion can be presented in an interesting manner that every member of the team can understand. A comparison can be made between such foreign weapons as the Soviet-produced *SAGGER* and *SWATTER* antitank guided missiles and the US-produced *TOW* and *DRAGON*. *What are the capabilities and vulnerabilities of these weapons? How would other direct-fire weapons such as the SPG-9 recoilless gun and the RPG-7 be employed? How do you kill a T62 tank?*

INFORMATION FLOW TO THE TEAM

Once a good threat education program has been instituted, attention should be directed toward what may be the greatest gap in the intelligence system of a brigade or division — the timely dissemination of pertinent data between the tactical operations center (TOC) and the CO's shelter half or command track.

The rapid downward flow of information is essential to

the team commander's decision-making process because his organic company-level collection agencies usually are not sufficient. In this regard, commanders and intelligence officers one and two echelons higher must identify the needs of the team commander for information as thoroughly as the company's needs for personnel and supplies are recognized by the S1 and S4. If the tank/mechanized infantry team's organic assets are unable to collect adequate data to serve as the basis for a decision, and higher headquarters personnel filter needed information, then the team commander is forced to resort to his "gut" feeling about enemy situation. TOC personnel should ask themselves the following question on each incoming message: *Do the team commanders need the information for their current operations?* If yes, pass the data on at once. If no, hold the information and possibly pass it later.

TECHNIQUES OF DISSEMINATION

Several techniques are available to improve the flow of information from higher headquarters to the people who do the fighting. The important point is that the data should be passed to the team commander in a form that is convenient for him. The following tips may be useful in achieving this:

Make extensive use of large-scale photographs for planning purposes at the company level. The team commander can use the photos and his map to select routes that make the best use of cover and concealment offered by the terrain. In many cases the terrain has not changed significantly, so old photographic coverage is acceptable. Enemy activity can be plotted on the photos so that the team commander can assess the location of enemy units while simultaneously conducting a terrain analysis. It is the G2's job to obtain the photographic coverage and the S2's responsibility to assemble a photo packet keyed to the needs of his commander and subordinate battalions and/or companies.

The battalion S2 should hand-carry intelligence information to the team commander whenever possible. While in the company area, the S2 may be able to give many members of the team current intelligence briefing during a lull in the day's activities, such as during chow. Young soldiers have a thirst for information on the enemy. A simple talk on order of battle will increase their sense of purpose.

The battalion briefing is a traditional vehicle to disseminate intelligence/information to company commanders, but the intelligence officer must identify the constraints that operate against him in this situation. If the meeting is only 20 minutes long and the S3 has to talk about the operation order, and other staff officers and the commander have things to say, the S2 may be allocated only two to three minutes. He should talk about more than the weather and password! *How about a quick lesson on the vulnerabilities of selected enemy weapons?* The S2 always should supplement his briefing on the enemy situation with a written summary or overlay depicting the enemy forces. The company commanders may be so preoccupied with other problems that they will not retain an oral summary of the enemy situation. Sketches, pictures, or pencil notes that can be examined later are preferable.

TRAINING DIFFICULTIES

The team commander may devote much of his time to practicing traveling, traveling overwatch and bounding overwatch without considering how he will assess the threat that will dictate one of these forms of movement. Intelligence training needs to be integrated during these movement-to-contact exercises so that the full decision-making process can be exercised.

Under the decentralized training philosophy, company personnel will spend a great deal of their time training in sections, platoons, or as an entire company. The battalion headquarters will be concerned primarily with planning and evaluating company-level training and possibly participating in higher headquarters'-directed command post exercises. Seldom will the entire battalion operate in the field as a combined arms team, even though many commanders would like to do so more often. Thus, the opportunity to practice the dissemination of intelligence/information between the battalion and the teams is minimal. This is the heart of the information flow problem. Because training often is so poor in this area, there may be a loss of about one-third of the contents of spot reports passed between each headquarters in the chain of command during field training exercises. This means that a commander two or three echelons removed from the source of the information may receive only a fraction of the data he needs for a tactical decision.

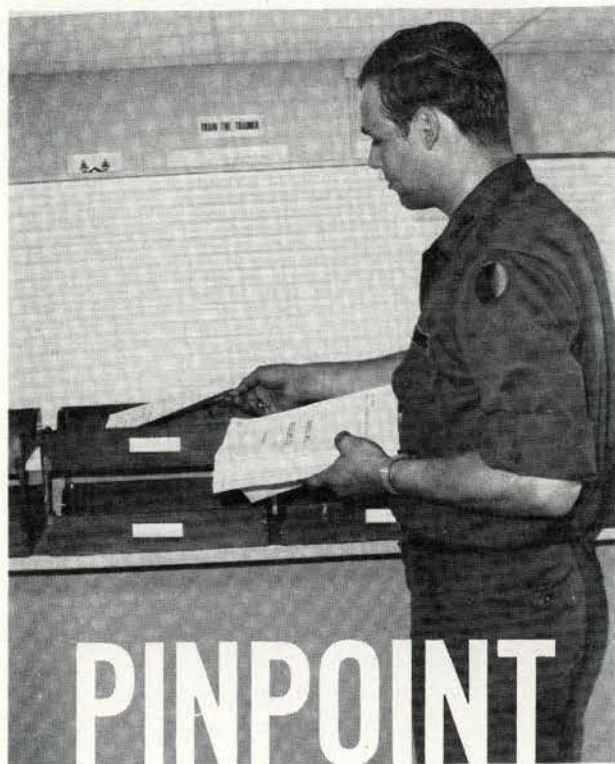
Intelligence training at the company and battalion level is difficult; yet, the battalion S2 can build enemy situations that will allow the team to be employed in such a way that it will cause the commander to change his threat assessment from *contact is possible* to *contact is expected*, and then make a decision to change his movement-to-contact technique.

SUMMARY

The ability of a team commander to select an appropriate movement technique is keyed to his determination of the probability of enemy contact. The team's likelihood of success can be improved if the threat is correctly assessed. A training environment must be created that allows the team commander to develop and exercise this decision-making process.



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Major R. William Highlander

"Boy, is the system screwed up! I can't even get the field manuals I need to train my unit."

"How the hell am I supposed to keep these vehicles maintained if I don't have the right tech manuals?"

Heard that before? Maybe you've said it. Complaints like that are echoed in many troop units. But why aren't the manuals and training literature available to soldiers? Why are unit libraries skimpy at best?

After all, the Army has a means to get publications right to the unit. Why isn't it working? What can be done to make it work?

The Army publications supply system contains more than 50,000 different publications and blank forms. And a large number of these are important to the training, maintenance and administration of the company. Except for blank forms, publications are distributed through a system that "pinpoints" a unit in the field.

The pinpoint distribution system is designed to send manuals directly to a unit. Intermediate headquarters can't shortstop your copies; the literature comes straight to you. But here's the kicker—you don't get zilch unless your unit requests to be put on the mailing list.

To be "pinpointed," a unit must have an account with the AG Publications Centers. Every company-size unit of the active Army, State Adjutants General and selected Reserve component units can establish an account. Companies need the approval of battalion, but that should be a nonproblem.

A pinpoint account is established by submitting DA Form 12. One copy is sent to the AG Publications Center in Baltimore for administrative and training publications, recruiting material and civil defense literature. Another copy must be forwarded to the St. Louis center for technical and supply publications.

But you say your unit has already done that and you still don't get manuals? Well, maybe you haven't done your homework. The DA 12 only opens the account. Along with the DA 12, the unit must send the appropriate forms of the DA 12-series to indicate which publications you want.

A recent informal survey of 11 units showed that all had an account number, but only one (yup, one!) had submitted and maintained the proper 12-series forms. About 50 per cent of the companies didn't even have a copy of the DA 12 on file—they were receiving some publications, but nobody in the units knew how or why.

A recent survey showed that nearly two-thirds of US Army Infantry School students had never seen the excellent technical manuals on the M60 machine gun (dated October 1970) and the M16A1 rifle (dated January 1972). Both of these manuals are important to the infantryman and as the survey stated: "If 73.7 per cent of the surveyed Infantry captains have not seen the M60 manual, what can we expect of soldiers in their units?"

It's quite a task to keep up with the paperwork but it should be a normal function of unit administration. There are more than 20 different forms in the 12-series, each pertaining to a category of publications. And the distribution centers don't employ mindreaders—they don't even know you exist or know what you need until you tell them. That's the purpose of the DA 12 and the 12-series forms.

If your records are skimpy, drop a line to the AG Publications Centers, asking for a computer print-out showing all forms and data on file for your account number. The print-out will help you decide which forms to submit, cancel or modify. You won't need to submit all the forms, so that reduces the workload some. The following seven forms are considered most applicable to combat arms units:

- DA 12-4** Requirements for DA Administrative Publications Other than Regulations and Circulars
- DA 12-9a** Requirements for DA Circulars and Regulations
- DA 12-11** Requirements for Army Doctrinal Publications
- DA 12-37** Requirements for DA Operation and Maintenance Literature applicable to Combat Vehicles for Organizational Support

DA 12-40 Requirements for Army Artillery, Small Arms, and Conventional Ammunition Technical Publications

DA 12-51 Requirements for Army Field Radio Equipment Technical Publications

Although those are of the most interest, this doesn't mean you should ignore the others. Check all the forms every once in awhile to see if you need some publications you're not getting. Because new items are added to revised editions of the forms, the commander should review the status of the seven forms mentioned above at least twice a year. Be sure the form on file is the latest one and that the forms reflect the correct number of copies you need.

Don't overlook the weekly bulletin from each of the AG Publications Centers. The bulletin updates the list of available publications. If you're not receiving it, order the bulletin on DA 12-4. There's probably a lot of units that have stopped getting publications because someone failed to read the bulletin of 26 February 1973. That one stated that **certain revised forms would have to be submitted; failure to do so would cancel distribution of new publications.**

Another point to remember is that the unit will receive only those items printed after the pinpoint account is established. If your unit library is missing critical publications or you need additional copies, you request those on DA 17. You can use this form anytime, but if you keep your pinpoint account in order, you won't need it often.

If you do have an account number and you need publications in a hurry, you can call the Publication Center. This should be used only in emergencies and your post publications officer can help you decide that. You can contact the Baltimore Center on AUTOVON 231-3431; the St. Louis Center on AUTOVON 698-7339.

If your training officer doesn't have a copy of DA Pam 310-10, he should have. This Guide for Publications Supply Personnel has all the information to put the pinpoint account in good order. The post publications officer is always willing to help units get things squared away, too.

No one can do his work effectively without referring to one or more publications at times. This is particularly true to administration, training and maintenance—and those three things sum up the major tasks of a combat arms unit. There may be some problems with the pinpoint distribution system and you still might not get all the publications you need—but you'll get a lot less if you don't do your part to make the system work.

NOTE: This is an up-dated version of the author's article published in the January-February 1974 issue of Infantry magazine. □

This poem was written by an enlisted member of Company D, 2d Medium Tank Battalion, 67th Armor, 4th Armored Division. It is printed here for the benefit of all Armor personnel.—Editor

TANKER TO GOD—OVER

By

R. C. Johnson

I pray thee Heavenly Father,
Please hear this tanker's prayer
And send an angel to me
For my tank and crew to care.

Be with us when we need you,
And lend a helping hand
And carry safely my machine
Across this barren land.

And keep my tank from running dry
When the foe is close to me,
And place my gunner's cross hairs
On the tanks that we don't see.

Keep our wedge nuts on and tightened,
And the tension in our track
And be the eyes for our guards at night
When we are in the sack.

Please keep our radios in shape
And our commo working right,
Be with us when we kneel and pray
Ride with us day and night.

Please keep our ammo coming,
Help us ring out freedom's bell,
But above all Heavenly Father
See we do our duty well.

And if we fall in combat
In the mist of morning gray,
We ask you to accept us
These things dear Lord we pray.

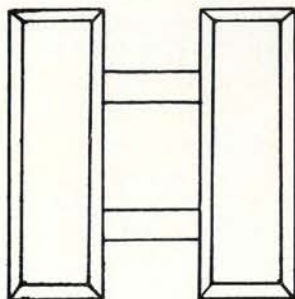
ARMOR—March-April, 1961

ONE of the long-heard pleas from the company commander in the past few years has been, "Let me train my own company!" Many times this plea has been heard since World War II, but until recently it had not been acted upon. In June 1971 General W. O. Westmoreland, then Army Chief of Staff, stated that he felt it was time the Army placed more responsibility on the shoulders of the junior commissioned officer. His first step in implementing this idea was to decentralize training down to the company level and give the company, battery or troop commanders the chance they wanted.

Because the source was the chief of staff, there was much pressure from higher commands to see that this concept was implemented as soon as possible. Most senior commanders agreed it was time the junior officers began to train their own people and to take the responsibility for their own actions. However, this turnover was so complete that some senior commanders stated: "the planning, management, administration, and conduct of training must be delegated to company, battery and troop commanders. This company-level responsibility encompasses all aspects of training. Included are such activities as writing training plans, establishing coordination for use of the training areas and ranges, developing and implementing training schedules, procurement of training aids and equipment, and requesting and obtaining ammunition."

At first this sounded great to the junior officer, but then a hidden fear began to develop, "How can I handle this mission?" They were uncertain as to what their responsibility was and to what degree the higher headquarters were to influence the actions of the lower.

The company commander, while happy to finally be training his own troops, did not have all the necessary resources and training to accomplish this task. Many company commanders asked, "How can I do a job for which I have never been trained?" The battalion commander, knowing his responsibility to his higher headquarters, was unsure as to how much responsibility he was to allow the company commander to have. He also wanted



A Captain's View of Decentralized Training

by Captain Robert M. Strickland

to know what his responsibility was for training the companies.

There was no great wealth of documents or reports to draw information from to answer these questions. The guidelines under which everyone had worked were no longer there. Many people began to wonder if this new idea really could work. Even now, nearly four years later, some of these questions still exist.

Decentralized training can work, but only through sincere cooperation and coordination of the company, battery or troop commander and his superior commander. Several problems and misconceptions which face both the company commander and his senior commander must be dealt with before we can propose a solution.

One of the major problems facing the company commander is the misconception that any guidelines that he receives from his senior commander are forms of centralization which are creeping in to usurp his new-found freedom and authority. Many junior officers would like to be called into a battalion or squadron commander's office and told, "Captain, here is your company. The next ATT is in one

year. Have your unit ready at that time." However, this does not allow the battalion or squadron commander any way of insuring that this unit is adequately preparing itself for the mission it is to perform. The battalion commander cannot run his battalion in that manner and be sure of accomplishing his mission. He must give the company or troop commander a mission to accomplish and then supervise and help him to insure that the battalion's mission is reached.

Another major problem of the company, battery or troop commander is his lack of training in the area of training management and his lack of resources to accomplish his training mission. Most junior officers today have not received much formal training in the "nuts and bolts" of setting up and running a complete and thorough training program. These programs have always just been handed down to him and all he has to do is follow them to the letter.

But now, in many cases, he has been thrown in the water as an untrained manager and planner and expected to either sink or swim. In other cases, he is still led by the hand so much that he never has the chance to make mistakes or learn from his own experiences. Most company, battery or troop commanders simply want their superiors to "give them a job and let them do it."

However, when this mission is given to them it must be clearly stated, taking into account the individual commander's knowledge, training and resources. Resources are a real problem to the company, battery or troop commander. Many commanders are not fully aware of the problems of setting up ranges, classrooms or practical exercise areas. Too many times these commanders forget that there are two other companies in the battalion that have the same problems. Here is where the idea of cooperation and prior planning really comes into effect. A last minute change in the training schedule may seem like only a small problem to one commander but can cause a large problem in other companies.

One of the strangest misconceptions held by some company, battery and troop commanders is that of the "no

inspections syndrome." Lieutenant General Collins has stated the problem this way: "I have found considerable misunderstanding . . . of responsibility on the subject of decentralized training. At the company level, I found some lieutenants and captains who said decentralized training means, 'I should be left alone; I should not be inspected, and I should be allowed to do the training I want to do without any supervision'." These company, battery or troop commanders feel that the only time they should be inspected is during ATTs or ORTTs. But this idea leaves two glaring problems. The first is how the battalion or squadron commander is going to know what training is being accomplished in his battalion or squadron, if he does not inspect the training regularly. When

. . . some junior officers do not realize or appreciate the responsibility of their superior officers and where their unit fits into the whole picture.

some company, battery or troop commanders are asked if they inspect and supervise the training of their platoons regularly, the answer is "yes." But at the same time they fail to recognize the need for battalion or squadron commanders to inspect their companies, batteries or troops. The second problem is how the company, battery or troop commander can insure that he is headed in the right direction in his training program. A commander could train very effectively in one area of his mission and completely fail his unit tests if his goals and objectives were misdirected. If a battalion or squadron commander supervises and inspects his units regularly he can spot these trouble areas early and set the unit's training in the right direction. The main underlying problem in these misconceptions is that some junior officers do not realize or appreciate the responsibility of their superior officers and where their unit fits into the whole picture.

Not all of the problems and misconceptions lay at the company, battery or troop commander's doorstep. There are several areas where the battalion or squadron commanders are at fault also. General Collins in his "Training Notes" identifies one of the misconceptions at the battalion and

squadron level. He states: "I found an occasional battalion or brigade commander who felt that decentralized training meant that he no longer had responsibility for it. If the training was bad, it was because the company officers were doing a poor job of it since training was decentralized and therefore their responsibility." This idea of decentralized training leaves the company commander hanging in the air on occasions. He begins to feel that he cannot afford to make an honest mistake because he will not be backed by his battalion or squadron commander. Therefore, if he does make a mistake he must either try and cover it up or incur the wrath of his commander.

The other end of the spectrum is just as bad. There are some commanders who say that the company commander will do exactly as they say and plan. These commanders allow very little room for the company, battery or troop commander to grow and develop his own ability to lead and train his troops. These commanders are willing to take the responsibility for all training except that of their company, battery and troop commanders. Lieutenant General G. H. Davidson stated this problem when he said: "The system tells him (the junior officer) in precise detail what he may and may not do and just how to do it. He rarely has to think for himself. The challenge of his job is emasculated." General Davidson feels that if we do not train the junior officers to think for themselves today we may have to pay for our errors on the battlefield tomorrow. These are the two extremes of the spectrum. Most of the battalion and squadron commanders lie somewhere in between.

The one question asked by many officers, both junior and senior is, "How can we make decentralized training work?" There are several key areas which must be looked at in order for the concept to work. The first area is that of guidelines. We must have guidelines within which to work. In his article in the November-December 1973 issue of *ARMOR*, Major General Starry outlined the idea of decentralization. He equated it to a mission-type order with three elements; what is to be done, what is not

to be done, and with what the task is to be done. He stated: "Note the absence of the word *how*. The fundamental difference between *what* and *how* is the key to understanding the mission-type order concept and the idea of decentralization. *Decentralization* is delegation of responsibility and authority for executing a mission to the lowest level of command which has, or to which can be made available, the requisite resources to accomplish the mission."

Therefore, even though the responsibility for the training rests on the commander's shoulders for his unit, he must have an overall plan or guidelines from his higher headquarters to work within to insure that his unit will fit into the overall plan and mission of the Army. Furthermore, in giving guidance and planning to his subordinates, each commander must insure that his subordinates have the capability to conduct the planned training or that it is made available to him. In his "Training Guidelines FY 74," General W. T. Kerwin Jr. stated: "Decentralized training policy does not, in any way, abrogate command responsibility. Every commander is still responsible for the training of his unit. Some of our junior, inexperienced commanders and leaders lack the expertise to train their units. Therefore, the more experienced commanders and staff officers must provide guidance in planning and conducting good training."

The second area of decentralized training — supervision — is closely tied in with the first area mentioned above. In "Gunfighter's Training Note No. 1," Lieutenant Colonel R. T. Churchill stated: "Decentralized training does not mean that company or battalion commanders are to conduct their training without the supervision of higher headquarters, nor does it mean that headquarters above the battalion level have no further responsibility for training. On the contrary, close and continuous supervision of training by all echelons of command (without *over-control*) remains an essential element of the division's training standards."

The old adage that "nothing is done right that is not supervised" is certainly true in training. The idea to remember is not to over-supervise

your subordinate commanders. We have to learn to lead, guide, suggest and teach without dictating the exact means or *how* to accomplish the training mission. Lieutenant General Collins stated this idea when he said: "The battalion and brigade commanders should be constantly looking at the training of the companies to see that the objectives are being achieved. But even more important, the colonels and lieutenant colonels should take opportunities to suggest new ideas or alternative approaches for the young officers to consider in doing their training. Constructive criticism is the means and improved training is the objective. This is what decentralized training means."

A third area that needs to be considered is that of coordination and

"Constructive criticism is the means and improved training is the objective. This is what decentralized training means."

cooperation. One of the hardest things to learn is how to coordinate properly. The main key to coordination is cooperation and flexibility. This area of training mainly falls in the company, battery or troop commander's area of responsibility. If the company commander is responsible for the *how* of his training programs, he must plan ahead. He will need not only to coordinate training areas, ranges and supplies, but he will also have to coordinate with those in his unit and outside of his unit who will conduct the lessons. There will be many items in the company, battery or troop training program which will not be found at the unit level. Each company commander must realize that he must coordinate with his higher headquarters for these items well in advance. He needs to remember that there are other units like his that are facing the same problems as his. General Collins states that this is a major area of misunderstanding. "Another area of misunderstanding pertains to changing the training schedule. Some junior officers equate decentralized training with the right to change training schedules at will, on short notice, and rather frequently. Some senior officers prescribe a very rigid adherence to the published schedule once it is in print."

General Collins then goes on to say that the training schedule is not inflexible. Everyone has ample opportunity to see the schedule at least two to three weeks ahead of time. This gives everyone plenty of time to coordinate training needs early. If a need arises to make a late change, then the company commander should have good reasons and the battalion or squadron commander should be notified why the change has been made.

The last area of decentralized training to be discussed is that of communication. As commanders we need to learn to speak clearly and listen attentively. General Collins stated that: "A good commander will patiently and carefully instruct his subordinates to insure that they know what is expected." Each commander

... communication is not only from the top down, but also from the bottom up. Company commanders must effectively communicate with their senior commanders.

must insure that each person in his unit knows what his mission is and that he has the authority to carry out that mission. If commanders will insure that the *what* (objectives to be reached) is understood completely by his subordinates, then his training will be effective. However, this area of communication is not only from the top down, but also from the bottom up. Company commanders must effectively communicate with their senior commanders. A battalion commander cannot answer a question if it is not asked. He can not give guidance if he does not know the problem. He can not supply the needed items if he does not know the need exists. Most company commanders try to do too much on their own. There is a wealth of knowledge and help at the battalion and squadron level if the company, battery, or troop commander will only take time to ask for it. The old adage of "keeping the commander informed" is very true. It is a simple matter of coordination and cooperation.

The underlying key to all these areas is that of responsibility. All commanders, both senior and junior, are responsible for the training of the Army. Each of us is a member of a team. Decentralization does not mean that each unit is a separate identity

all of its own being. Each unit is a part of the whole. The basic building block of the unit is the individual soldier. From there we continue to build one block upon another. Each block depends on the strength of those under it. Therefore, we must all take the responsibility given to us to develop the US Army soldier into the best soldier possible. Together we can do it. Decentralized training can work if both senior and junior officers sincerely work together. Company commanders must learn to train and command their companies without detailed instruction of higher commanders. Someday they will be called on to lead their troops into battle and the battalion and squadron commanders will not be there to take them each step of the way. Senior commanders need to teach, suggest, criticize and lead their company commanders. Battalion commanders should be willing to underwrite the honest mistakes of their company commanders. It is better for them to make mistakes on the training exercises than on tomorrow's battlefields. But with the skillful guidance of senior officers, they will be able to develop into leaders who can see the successful completion of their missions on the battlefield of tomorrow.



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short! over! lost! OR ... TARGET ⊕



by Captain Andrew J. Bacevich Jr.

"THE PURPOSE of the Advanced Course is to prepare officers for company command and staff duties at the battalion/squadron level with emphasis on duties of company command level." That seems straightforward enough. Given the responsibilities of troop command in the 1970s, and the tender age at which young officers frequently have that challenge thrust upon them, the need for a formal course specifically designed to prepare the officer for command is unassailable. Yet the gap yawning between what the Armor Officer Advanced Course is intended to be and what it has become is so great that the differences far outnumber the similarities. Dissatisfaction with the AOAC is something of a tradition within the Armor community: the jokes about three months of content crammed into a nine-month course, about the student taking Golf 101 for an elective — both semesters — are moth-eaten at best but continue to make the rounds.

The current edition of the AOAC student typically sees his assignment less as an opportunity for professional development than as a trial to be endured before moving on to bigger and better things. To use an unfashionable term, the course is a ticket-punch. The student gripes incessantly about irrelevant material, poorly presented instruction, excessive demands on his time and inadequate parking facilities. To listen to him is to conclude, quite incorrectly, that he is an unprofessional grumbler burdened

with an excessive number of boats, campers and fast cars.

The student is quick to throw all the blame for his unhappiness on the broad, if aching, shoulders of "The School." For its part, and to its credit, the Armor School can point to a series of extensive if only moderately successful efforts to respond to student grievances. It proudly notes in its literature that the course was recently "systems engineered." Instruction in the revised course is "more comparable to graduate-level instruction than has been true in the past." The FY 75 curriculum features leadership discussion groups, independent research projects, and a wide range of military and non-military electives, among other innovations. Student response to this impressive effort to reply to their criticism is resoundingly negative.

Student comments, religiously solicited by the school, generally aim at sharpshooting a particularly weak instructor or poorly-conceived bloc of instruction. (Counterinsurgency is taught by parroting the paragraph heading of FM 31-16, last revised a full year before the 1968 Tet Offensive.) As such, they are useful, but distract attention from the course's essential defects. Two such faults are particularly glaring and both reflect a lack of that virtue which we in Armor celebrate above all others — *flexibility*.

The first problem is one of personnel management. If the primary purpose of the Advanced Course is to prepare the student for company/troop command, it follows that

the appropriate time for attendance is before rather than after he becomes a commander. Significantly, a substantial majority of those attending AOAC-75 have already completed at least one command tour. The extent to which the effectiveness of these officers as commanders may have been reduced for lack of correct level schooling cannot be measured but is probably great. Of equal importance, many students began the course knowing full well that their previous command experience all but eliminated the likelihood of their returning to troop duty after graduation. Armor Branch had assured them that, *having completed the Advanced Course*, they would be off to degree completion, recruiting, ROTC, or advanced civil schooling. Such assurances inevitably detract from the student's incentive to grasp the details of commandership — maintenance, administration, supply economy, personnel management and gunnery — for which he perceives little need in the near future. The inspection of the Herman Nelson heater, dry enough of itself, becomes even more so to the student firmly convinced that he won't come within hailing distance of that piece of equipment for the next three years — by which time, the instructor assures him, it will be out of the inventory.

A second problem is rooted in the Armor School's unswerving devotion to a PCS-length course. In clinging to the nine-month course, the school has found itself accused of padding the course with extraneous instruction solely to fill up the number of classroom hours which had been allotted beforehand. Until recently, the "Kill-The-Dead-Horse" method was the primary technique used to fill up those awkward hours when the teaching points had

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been driven home but the training schedule had lunch still a long way off. Today, to stimulate the interest of jaded students, the time-fillers are substantially more imaginative, if correspondingly less relevant to the course's stated purpose of preparing officers for troop command and battalion-level staff. As a result, the FY 75 course includes such varied fare as an analysis of the electromagnetic pulse, an explanation of USAF command and control structure featuring a bewildering array of acronyms and an elective in Mandarin Chinese. Valuable subjects all, but limited utility to the guy soon to command a cavalry troop on the Czech border.

Military history, a mandatory elective in AOAC, exemplifies this situation. Perhaps the showpiece of the revised curriculum, the history sub-course examines warfare from Napoleon through Korea in an amazingly comprehensive fashion (one 80-minute class disposed of the Battle of Kursk, The Normandy Invasion and the December 1944 German Counter-offensive) and is generally well-received.

But aside from trying to do too much in too little time, the course is further hampered by the tremendous diversity in the education and personal interests of the students. Educational qualifications run the gamut from high school diplomas through graduate and professional degrees. Student participation is necessarily uneven. The instructor's dilemma as to exactly at which level the course should be conducted is correspondingly great. To some buffs, noth-

... these defects avail themselves to a fairly simple solution. The most essential ingredient required is a willingness to pursue change to seek out the imaginative solution.

ing could be more interesting or profitably studied than the invasion of Russia circa 1812, while others, no less able men, again experience those nagging doubts about relevance. That the study of history can be particularly meaningful for military men is axiomatic; however, the relevant historical lessons for young armor leaders are less likely to be found in the study of Napoleon or Sherman or Patton than in the techniques and tactics employed by junior leaders who achieved success in mechanized warfare. The purpose of AOAC, after all, is to train captains, not field marshals.

And how does one improve the course? Fortunately, these defects avail themselves to fairly simple solution. The most essential ingredient required is a willingness to pursue change, to seek out the imaginative solution. Field Marshal Rommel, a man of no mean imagination himself, observed that "Prejudice against innovations is a typical characteristic of an Officer Corps which has grown up in a well-trying and proved system." One suspects that Rommel would have classified us as all too often "typical."

But given a reasonable willingness to innovate, a primary change could well be in assignment policies whereby an officer would only attend the Advanced Course immediately prior to troop duty. Just as funded graduate schooling must be followed by a utilization tour so should completion of the Advanced Course require immediate use of those skills learned in the course. For the student assured of returning to the troops, the course becomes remarkably relevant.

Armor management, in ceasing to treat AOAC as a hurdle to be overcome before moving on to non-troop assignments, would simultaneously eradicate the perception of the course as a ticket to be punched. The officer whose career has encompassed successful command prior to an advanced course, and who is earmarked for a non-troop duty assignment should be permitted the option of "validating" the course, his successful application in the field of the percepts taught in AOAC classrooms rendering the course largely superfluous. This is not to say that every captain with a few months of command under his belt is "branch-qualified." The decision to send an officer to AOAC at a particular time or to excuse him from it altogether must be based on the professional needs of the individual. That is personnel management.

Flexible, rational scheduling of AOAC means breaking

away from some of the career patterns we have come to expect. The officer bound for degree completion should attend college before rather than after the career course. Likewise, the lieutenant concluding his initial CONUS assignment and enroute to a long-tour area may be promoted to captain prior to his return and has a reasonable expectation of command while overseas. Although commissioned no more than three years, he needs the Advanced Course. The young captain, advised by his squadron commander that he is in line for the next troop to open up, needs AOAC *right now* — not when he is next due to PCS.

Flexible assignment policies are crucial. But the fact that the course is conducted infrequently and is of such a length that it is necessarily a PCS move are major obstacles to flexibility. Again, neither obstacle is insurmountable.

One notes in passing that the Israeli equivalent of AOAC is 67 days in duration, all but four of which are spent in the desert where the students run a series of nearly continuous dry fire/live fire tactical exercises with a TOE tank

... a ruthless review of the course curriculum is clearly in order.

battalion provided for the purpose. While such a program may not suit our needs, it graphically demonstrates that there is more than one way to effectively educate a company commander. There is certainly nothing sacred about sitting in a classroom for months on end.

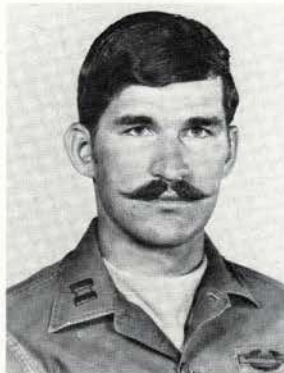
To enhance both relevance and flexibility, a ruthless review of the course curriculum is clearly in order. By eliminating all subject matter not contributing directly to an officer's preparation for troop command, AOAC could be converted into a TDY course presented several times a year. The recent decision to modify the course to six months in length may be a step in that direction, but only a step. The fact that the course continues to be a PCS assignment presented only twice annually, limits the usefulness of that change. The school may well have several more steps ahead of it.

In reviewing the curriculum, the delusion that AOAC is in any way a graduate school should be discarded. The Advanced Course is not the time to pile up college credits nor to study Napoleon. The entire elective program, to include regrettably military history, should be eliminated. Even military subjects not pertinent to the stated course

... the delusion that AOAC is in any way a graduate school should be discarded.

objective should be junked. The career course is the capstone of an officer's basic branch education. It is a "finishing" school, expanding on and perfecting the techniques and practical skills needed to successfully command troops. The course of instruction should be designed with that in mind.

An Advanced Course that is short, to the point and relevant to the professional needs of the student will maintain his interest. Inserted at the proper place in the careers of our young officers it will provide us with better qualified unit commanders and, in turn, better units. And having achieved that, it will have become the kind of Advanced Course which both our young officers and our entire branch deserve.



CPT ANDREW J. BACEVICH JR. was commissioned in Armor from the US Military Academy in 1969. Formerly a troop commander with the 3d Armored Cavalry Regiment, Captain Bacevich currently attends the Armor Officer Advanced Course.

M48 Reference Material Needed

The Army-Wide Training Support Department, US Army Armor School is requesting assistance in obtaining reference material for the development of Training Extension Course (TEC) lessons on the **M48**-series tank. Most urgently needed are copies of **FM 17-79**. Other publications which would be helpful include **TM 9-7012**, and training circulars or pamphlets dealing with operation, maintenance and gunnery. Anyone having access to these publications is requested to either loan or donate them to the Army-Wide Training Support Department. Publications loaned to the department will be returned promptly upon completion of the project. Arrangements for material pickup can be made by calling CPT Self—AUTOVON 464-1434/1640 or Commercial (502) 624-1434. Materials may be sent, if desired, directly to:

Director, Army-Wide Training Support Department
ATTN: CPT Self
US Army Armor School
Fort Knox, KY 40121

FROM THE **ARMOR BRANCH CHIEF**

COL JOHN R. BYERS



THE END OF AN ERA . . . AND A BEGINNING

Note the now famous lines of Hanson Baldwin: "Reverse the stirrups, turn out the mounts to pasture; the Cavalry has gone. The crepe is on the pommel, the mourning bow on the sword hilt; the Cavalry has gone . . ."

This issue of *ARMOR* marks another change, the end of Armor Branch in the Officer Personnel Directorate and the end, too, of "From the Armor Branch Chief." Since the early 1920s there has been either a Chief of Cavalry or a Chief of Armor Branch who has been responsible for the accession, training, assignments and professional development of every Cavalry and Armor officer in active service. Because Cavalry and Armor, its successor, have been relatively small branches among the combat arms, the officers who wore sabers or tanks were able to receive individual attention from Branch, and the high credibility enjoyed by Branch has been the result of that attention and personal interest. Now, because organizational changes in OPD will eliminate many branch offices, there is some concern among you that attention and care may diminish.

Take note of the rest of Baldwin's words: "And so the Cavalry, like all things mortal, has died. But its soul goes marching on."

Like the Cavalry, the soul and the spirit of Armor Branch will also go marching on. We were dedicated to insuring that all Armor and Cavalry units received the very best in leadership, that Armor officers in every assignment worldwide were developed and trained to satisfy the Army's needs, and that the officers themselves gained the maximum satisfaction from their assignments. Well, gentlemen, those are the same objectives of the new Officer Personnel Management System. It was to best meet those objectives, particularly to insure taking maximum advantages of the inherent abilities, aptitudes and interests of the individual officer, that OPD was reorganized. There'll be no changes in that attention and personal care given you.

This job has been an exciting and humbling one for me. Commanding a brigade was exhilarating, and being your Branch Chief has been equally stimulating. It's also been very sobering, knowing constantly that even my smallest decision impacted permanently on another soldier's career. That can take your breath away and give you considerable pause. As the new Chief of Majors Division, I will carry with me my concern and personal interest for each soldier's

welfare, and so will every other officer as he moves from Branch to his new job in OPD.

In these past two years I've written and talked face-to-face with thousands of you. I've been constantly impressed with the high quality, elan, and professional attitude of today's young officers. And I know that, regardless of any changes in OPD or DA, the Army will continue to be well-served by its most dedicated soldiers, its Armor and Cavalry officers.

One last and very important thing: never lose sight of the troops, never forget our soldiers.

See you along the tank trail.

SELECTIONS FOR THE COMMAND AND GENERAL STAFF COLLEGE DURING FY 77

Will I go to the Command and General Staff College or an equivalent school? If so, when? There are essentially two factors that must be considered in answering these two frequently asked questions. These factors are your overall manner of performance and individual availability.

Each year during the spring-summer time frame, the records of all Armor officers eligible for attendance at staff college-level schooling (selected for promotion to major, under 41 and less than 16 years service) are evaluated. This evaluation consists of a detailed analysis of each officer's file in order to determine relative order of merit for all eligible Armor officers.

Branch nominates from an OML up to 200 per cent of the quota for CGSC and equivalent schools. From these nominees, a DA Selection Board determines all who will attend.

The most critical consideration in this evaluation is an analysis of each officer's overall manner of performance. Close attention is paid to recent performance of duty in both specialties, and the level and degree of responsibility inherent in the various command and staff positions held by each individual. Other items that are scrutinized include military and civilian education and combat experience. This review results in both a subjective and objective judgment as to the overall capabilities of each officer.

Even though an officer's overall performance warrants selection, he may not attend school immediately unless he's available. If he's overseas, for example, or in a stabilized assignment he may attend at a later date. Generally speaking, this means that before an officer can attend CGSC,

he must complete at least 30 months of a CONUS assignment or at least five-sixths of an overseas tour. Some other assignments, such as USMA Staff and Faculty, ROTC and Army Educational Requirements Board utilization tours, normally require the completion of three years of service before attendance at CGSC-level schooling is considered. For those eligible and available we should have OMI standings available by early August. Names of those selected for FY 77 schooling should be released by the Board in December.

US ARMY COMMAND AND GENERAL STAFF COLLEGE NONRESIDENT INSTRUCTION PROGRAM

A significant milestone in an officer's career development pattern is attendance at either the Armed Forces Staff College (AFSC) or the US Army Command and General Staff College (USACGSC). Unfortunately, because of the limited number of quotas, many well-qualified Armor officers are denied the opportunity for resident AFSC/USACGSC attendance. Therefore, all officers who have not attained this important level of schooling should consider enrolling in the Command and General Staff Officer Course, Nonresident Instruction Program. This is particularly important for officers who have reached their 15th year of service but have missed CGSC selections. Acceptance for or completion of the CGSC N/R course, however, does not preclude subsequent selection for the resident course if otherwise eligible.

An officer who completes the nonresident program receives the same considerations on assignments as a resident course graduate and consideration for those staff assignments requiring CGSC completion.

Prerequisites for enrollment require you to have satisfactorily completed a branch officer advanced course, or equivalent. You must submit one copy of DA Form 145 (Army Extension Course Enrollment Application) through your commanding officer to the US Army Command and General Staff College, Fort Leavenworth, Kansas 66027, ATTN: Director of Nonresident Instruction. If a certificate of completion of the branch advanced course is not available for submission with the application, the routing must be through the US Army Armor School. A catalog outlining the nonresident course options and curriculum may be obtained from the college.

CHANGES IN AOAC

Recently there have been several changes involving both the length of the Armor Officer Advanced Course (AOAC) and the number of courses presented each year. AOAC will be conducted twice in FY 76. Class 76-1 will begin 3 September 1975 and graduate in March 1976. Class 76-2 will run from 13 January 1976 until July 1976. Each class will have approximately 125 Armor officers in attendance. These changes made it necessary for us to change the reporting date of a number of officers who were initially scheduled to report to Fort Knox in September to a reporting date of 13 January for class 76-2. Priority for attendance at class 76-1 was given to officers currently

serving foreign service tours whose tour completion dates coincide with the class 76-1 report date. Approximately 120 officers previously scheduled to attend class 76-1 in September have had their orders amended to reflect the January 1976 report date. We apologize for any inconvenience that the above changes may have caused the officers concerned.

CIVIL SCHOOLING IN PERSPECTIVE

We receive many inquiries from officers requesting full-time civil schooling. In some cases the officer appears to be giving civil schooling priority over all other assignment or career needs. While civil education may be an important and desirable goal, it is far from being the most important element of an officer's career. It's essential that we all recognize the role civil education should play in our military professional development and fully understand the purposes and objectives of the various programs for full-time schooling.

An Armor officer must first establish a firm Armor base from which to build his future career prior to being considered for full-time civil schooling. Civil education enhances a career; in itself, it does not "make" a career. Our analysis of past promotion and military schooling selection board results reveals that the level of civil education has not been a significant selection criterion past the undergraduate degree level. Outstanding manner of performance in all assignments has always been, and will continue to be, the key to success.

We strive to develop each officer's career to the limit of his abilities as we meet the needs of the service. The Army officer education goal seeks baccalaureate degrees for all officers, and education to the advanced degree level for certain officers to satisfy requirements validated by the Army Educational Requirements Board (AERB). Priority will continue to be given to officers seeking baccalaureate degrees since it's critical that you gain an undergraduate degree prior to consideration for field grade promotion. Several programs are available for full-time schooling, but consideration for civil schooling naturally must be made within this philosophy of professional development.

Officers who lack a baccalaureate degree, who have obtained the solid branch base mentioned above, whose overall manner of performance merits selection and who request schooling, will be programed for undergraduate study as rapidly as schooling quotas and assignment stability permit.

In the case of advanced degree schooling, an altogether different situation exists. All full-time advanced civil schooling is designed to meet specific Army requirements validated by the AERB. All officers, except for those in service school (CGSC/AWC) cooperative degree programs, selected for participation in fully or partially-funded graduate degree programs will be required to serve a three-year utilization assignment in a validated AERB position immediately following graduation.

Qualified officers are encouraged to apply for appropriate education programs; however, it appears that civil education may be receiving undue emphasis by some officers. It is important that the Army's educational goals,

needs of the service and personal desires for additional civil education remain in proper perspective. Sustained outstanding performance of military duty, coupled with normal military school progression, must remain foremost in each officer's mind.

RA SELECTION BOARD

The next RA Selection Board is scheduled to convene in September 1975 and will consider those applications that were received at DA by July 1975. AR 601-100 governs the appointment of officers in the Regular Army. As those of you who have applied know, selection and appointment is a time-consuming process. In order that you may better understand why this is so, this explanation of the selection/appointment cycle is provided.

The Regular Army Selection Board normally meets twice annually. Each board is announced and an application cut-off date established by a DA circular in the 601 series. The cut-off date is normally 60 to 90 days before the board is scheduled to convene. It is important to note that *applications are not received by Armor*; they go to Appointments Branch, Officer Personnel Directorate (DAPC-OPD-PD-PR). They require a 60 to 90 day period to prepare applications for presentation to the selection board.

The selection board is in session for two to three weeks and requires an additional 10 days to two weeks to prepare their results for submission to the Secretary of the Army.

After this tentative selection list is approved, individual letters to the 1200 to 2500 applicants, notifying them of their selection or non-selection, must be prepared, signed and dispatched.

The names of those officers tentatively selected for appointment must be submitted to the President for nomination and the Senate for confirmation, a process which requires an additional 60 to 90 days. In the meantime, the applicant must be certified as physically qualified by the appropriate examining facility commander. This means a physical if the applicant has not had one in the preceding six months. The results of a National Agency Check must also be reviewed at DA.

After Senate confirmation and the physical and security determinations have been made, each selected officer is sent an appointment packet, through channels, which contains the necessary forms for execution of the oath of office. Finally, when it's executed, you're a Regular Army officer. We are involved in the processing of applications only to the extent of placing the applicant on an order of merit list. Unless you notify us, the only way we know that you've applied is when Appointments Branch provides your name to us, and then only if you listed Armor as your first choice for appointment. So that we can assist you in getting your shot at selection, we recommend that you do the following:

Make sure that you include in your application all supporting documents required by AR 601-100 and the DA Circular that announced the selection board.

Insure that the application is properly addressed. The application is to be forwarded, through channels, to:

HQ Department of the Army
ATTN: DAPC-OPD-PD-PR
200 Stovall Street
Alexandria, VA 22332

Request the personnel officer at the level from which the application will be forwarded to DA (general court-martial authority) to send it by certified mail. While Appointment Branch does acknowledge receipt in writing, certified mailing will provide you further assurance that your application arrived before the cut-off date.

Advise Appointment Branch of any changes in your address.

HOW CAN I TELL WHAT KIND OF AN OFFICER I AM?

Basically, there are two ways — both of which should be considered. First is an OPD interview. We will tell you what your relative standing is if you're on any OML and review your file with you to help you understand why you stand where you do. Second is an honest self-evaluation. Try to define some clear career goals, e.g., "*What grade do I aspire to? What duty do I think is the pinnacle? What do I do best? What are my military education goals? My family goals?*" Try writing these down sometime. You think we're kidding? Why not try it; it's not as simple as you may believe. Then, outline how you think you can achieve them. This drill is even tougher. Finally, toughest of all, look honestly at yourself — both strengths and weaknesses — and see what you must do to reach your goals. DA Circular 600-3, Officer Professional Development and Utilization, will be a big help.

ASSIGNMENT TO ROTC DUTY

Are you interested in an ROTC assignment? Officers selected for this duty should have a desire to perform a very important and meaningful task in an academic environment. The impressions created by officers in ROTC positions have a significant and lasting effect on our nation's citizens and the future officer corps. Needless to say, these officers must be effective writers, speakers and instructors. They must be capable of motivating capable college men and women toward careers in the Army. When an officer is selected for ROTC duty, he is nominated to the institution through the ROTC Region Headquarters. Since many colleges and universities require that ROTC instructors have advanced degrees, personnel participating in the Advanced Degree Program for ROTC Instructor Duty (ADPRID) and individuals already possessing advanced degrees are used to fill most requirements. ADPRID allows an officer to enter an approved institution for up to two years of schooling to attain his advanced degree and then be assigned to ROTC duty, usually at the same school. ROTC assignments are stabilized for a minimum of two years, however, a normal tour is three years and participants in ADPRID will be stabilized for a minimum of three years of ROTC duty. Officers normally are posted

to ROTC duty during the summer months except to fill unprogramed vacancies. Officers interested in an ROTC assignment should advise your assignment officer (see AR 621-101 for details).

ASSIGNMENT TO THE UNITED STATES MILITARY ACADEMY

All career officers are eligible for an assignment to the United States Military Academy at West Point, New York. Since the majority of the positions require up to two years of graduate schooling followed by a three year assignment, officers are only considered available if they have accomplished certain critical career goals.

All officers must have an outstanding record, baccalaureate degree, completed company command and be graduated from an Advanced Course. Field grade officers should have completed CGSC-level schooling. Officers already possessing appropriate advanced degrees are eligible for direct assignment. OPD declares officers available and suitable; however, USMA determines final acceptance. More detailed information concerning the different positions and graduate schooling available may be obtained by writing the Superintendent, USMA, ATTN: MAAG-P, West Point, New York 10996.

BASIC YEAR GROUP (BYG)

For RA officers, BYG is the fiscal year of the basic date of RA appointment. For most OTRA officers, BYG is the fiscal year of entry on active duty as a commissioned officer. The BYG for OTRA officers who have prior service is the fiscal year they would have entered on AD if all of their active commissioned service had been performed on the current tour. For example, an RA officer who was commissioned on 6 August 1971 is in BYG 1972. An OTRA officer who was commissioned on 2 June 1972, but does not enter on active duty until 19 July 1972 is in BYG 1973.

SCHOOL YEAR GROUP (SYG)

Often called the academic year group, the SYG is 1 September through 31 August and is derived from the numbered year of the 31 August date. A Regular Army officer with a basic date of appointment of 6 July 1971 (BYG 1972) is in SYG 1971.

OPD TELEPHONE NUMBERS ARMOR SPECIALTY MONITORS

Effective 19 May with the OPD reorganization we all move to new jobs in OPD. So that you can find us, here

are our new telephone numbers (all are in Hoffman II). For AUTOVON calls, dial 221 and the last four digits of one of the listed numbers. For commercial calls, our Area Code is 703.

Colonels Division (6N59)

LTC John M. Petracca (Assignments)325-7874

Lieutenant Colonels Division (6S55)

LTC Patrick J. Quinlan (Assignments)325-7895

Majors Division (6S19)

Colonel John R. Byers (Chief, MAJs Div.)325-8117

LTC Glen Yarborough (Assignments)325-8858

MAJ Tommy Baucum (Personnel Actions)325-8120

MAJ Lee Fulmer (OPS & FAO Assignments)325-0687

Company Grade Combat Arms Division

LTC John M. Toolson (Chief, Armor Branch)325-7849

MAJ Bert Chole (CPTs Assignments)325-9444

MAJ Tom Montgomery (LTs Assignments)325-9444

MAJ John Archer (LTs Assignments)325-9444

MAJ Flash Born (AVN Assignments)325-9444

MR. Leo Leal (New Accessions)325-9444

WE NEED YOUR NUMBER, TOO

OPD receives and replies to thousands of cards and letters each month. In the majority of this correspondence, we can provide the desired information with a quick AUTOVON phone call. We prefer this method because it is usually faster and provides a more personal response. You can help by including your phone numbers whenever you correspond with us. Please provide both duty and home numbers, AUTOVON and commercial. Don't forget to put this information on your preference statements, too!

SOME REMINDERS

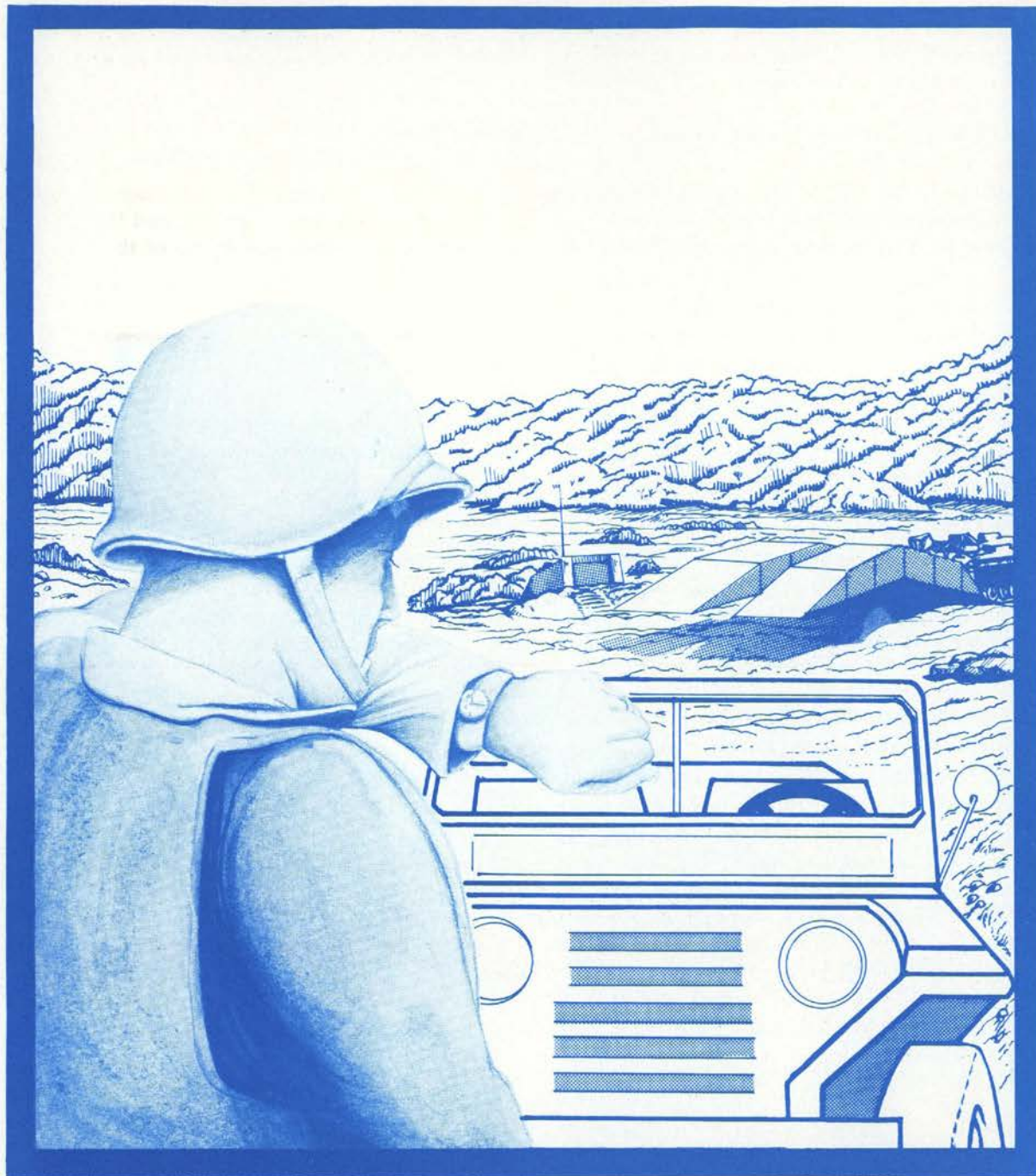
Photographs are extremely important. All RAs and OTRA officers upon promotion to first lieutenant must have one in his file that is less than four years old. *Is yours current?*

Is your Preference Statement accurate and up-to-date?

Have you received your Officer Record Brief? You should be provided a copy by your UPO in your month of birth.

Does DA have your official mailing address? Each time you move you should have the gaining personnel office submit a DA 2876 indicating where you want your mail sent. This address is included on the bottom right corner of your ORB. □

HOW WOULD YOU DO IT?



SITUATION:

You are commander of a combat support company of an armor battalion in the field. Your wrecker is deadlined, but all other company assets are available in a rear assembly area. Your unit must move forward in 1 hour. You have a $\frac{1}{4}$ -ton truck that is deadlined because of an inoperative generator, and you do not have another generator in your PLL. You do not want to drag it forward

with you, but you do have a 5-ton truck you can use to evacuate the $\frac{1}{4}$ -ton to the field trains where it can be fixed. You have a tow bar, but going forward, you don't want to tie it up on a $\frac{1}{4}$ -ton. You can evacuate the $\frac{1}{4}$ -ton *on* the 5-ton without tying up company assets that will be needed forward. Without the wrecker, how do you load the $\frac{1}{4}$ -ton onto the 5-ton?

AUTHOR: CPT THOMAS MURPHY

ILLUSTRATOR: STEPHEN CHAPPELL

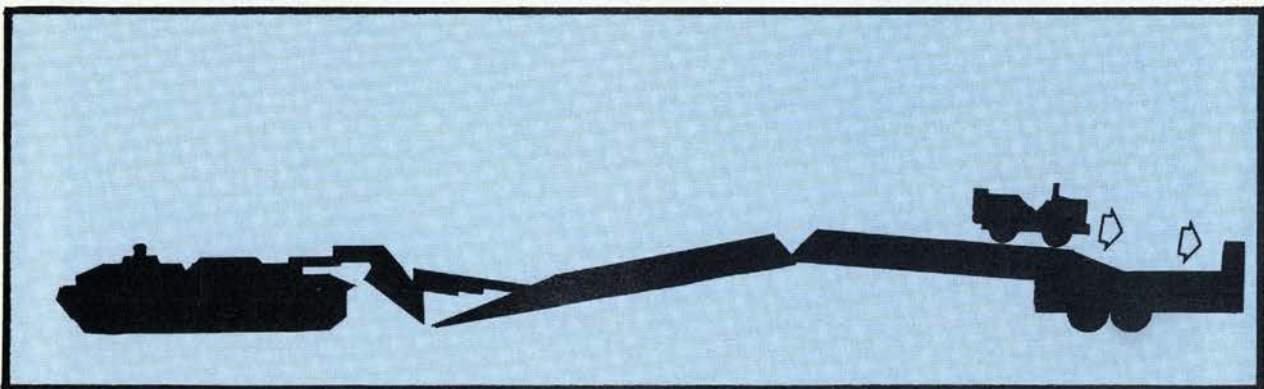
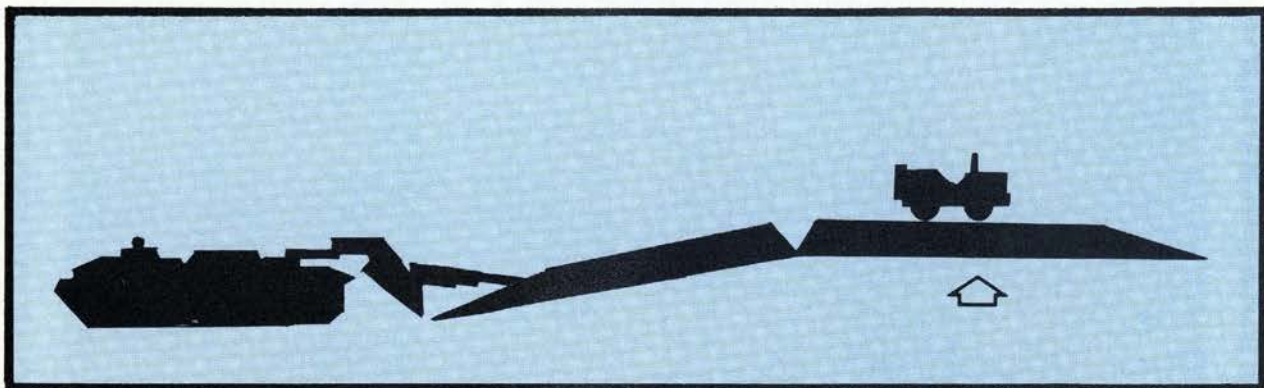
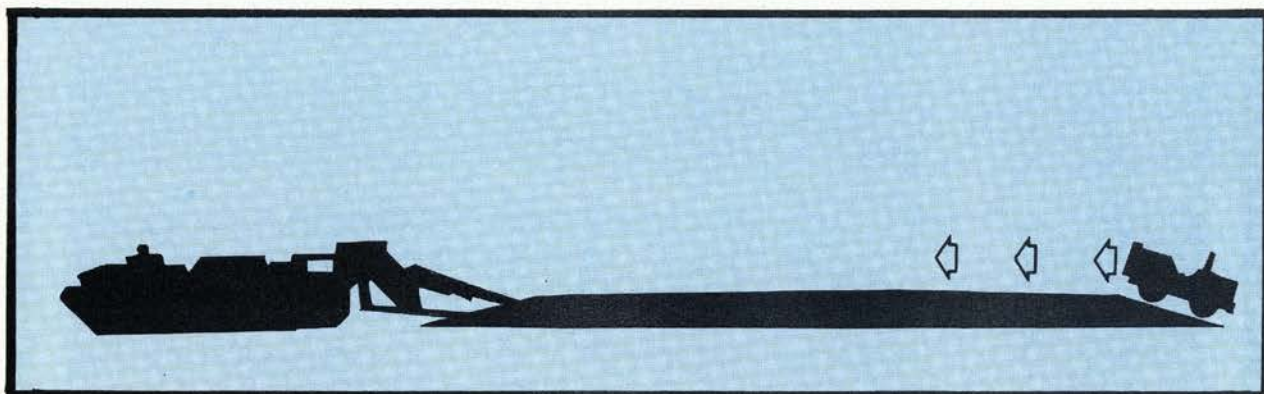
SOLUTION:

Using a great deal of field expedient imagination, the company maintenance section solved the problem with an AVLB. The AVLB bridge was laid flat on the ground and the $\frac{1}{4}$ -ton pushed up on the end of the bridge and the brakes set. The bridge was then lifted in the air and allowed to fold slightly in the middle to keep the end section and the $\frac{1}{4}$ -ton level with the ground. The 5-ton truck was then backed up under the end of the

bridge, the bridge lowered to the truck bed, and the $\frac{1}{4}$ -ton rolled off into the truck and securely tied down. The 5-ton truck with $\frac{1}{4}$ -ton and driver then moved to the field trains for repair.

This technique was actually used by Combat Support Company, 3d Bn, 64th Armor, at the Major Training Area, Hohenfels, Germany, in 1973.

CAUTION: This is a field expedient. It shows an emergency equipment potential, and should not be considered a routine application of the equipment.



The Armor School is currently developing audio-only lessons on the M48A1 tank. These are programmed for completion and delivery by the end of this fiscal year. Distribution will be automatic on the basis of one to each of the following: M48A1 equipped units, down to company level; Readiness Regions and appropriate groups; parent or supervisory headquarters of M48A1 units, to include brigade and division; and Army headquarters. Inquires concerning the M48A1 tank audio-only program should be directed to USAARMS, ATTN: AWTSD. Inquires concerning all other audio-only lessons should be directed to CATB, as indicated in the next item. M48A1 audio lessons now being produced are:

- Manual and Power Turret Operations
- Ballistic Computer Operation
- Range Finder Operation
- Boresighting and Emergency Zero
- Loading and Unloading the Main Gun
- Unloading a Misfired Main Gun Round
- Cold Weather Starting Procedures

Kits for each of the above lessons include an audio tape, illustrated text and Lesson Administrative Instructions, which includes instructions for practical application & examination for each lesson.

TEC LESSON IMPROVEMENT. Improvements in individual TEC lessons depend primarily on feedback from the user. Comments from using units and individuals regarding problems encountered in using the lesson, suggested changes, or recommendations are sincerely requested. Send to The Armor School, ATTN: AWTSD, Ft. Knox, KY 40121.

REPAIR OR REPLACEMENT OF TEC EQUIPMENT AND LESSONS. Repair or replacement of malfunctioning components of the TEC kit and damaged TEC lessons is the responsibility of the Training Aids Service Officer (TASO) supporting the unit or activity possessing the equipment. All inquiries concerning maintenance of these items should be directed to the appropriate TASO.

Dummy 90mm Ammunition, M48A1 Tank. The Army Munitions Command has an inventory of 90mm dummy ammunition adequate to meet unit training needs. They can be requisitioned through normal supply channels, using the following supply information:

Authority: CTA 23-103
Item: Cartridge, Dummy, 90mm
Stock No.: FSC 1315-C263

Training Support Update

New Television Tapes

The following Armor School TV tape programs have recently been completed. They are available for either ¾-inch cassette players or the 2-inch Sony Rover, and may be obtained through your local TASO, or by calling direct to the Fort Knox TV Division, AUTOVON 464-6745.

CONTROL NO.	TITLE	RUN TIME	CONTROL NO.	TITLE	RUN TIME
FK-ARS- 91-74	PM Battery Electrical	11:53	ARS- 4-75	PM Indicators-POL Storage and Dispensing	16:51
FK-ARS- 92-74	PM Air Induction	10:45	ARS- 5-75	PM Indicators and Inspection of Canvas and Webbing Equipment	18:47
FK-ARS- 93-74	PM Track Suspension	12:38	ARS- 6-75	PM Indicators and Inspection of Field Cooking and Heating Equipment, Part I	16:56
FK-ARS- 94-74	PM Cooling System	9:36		Part II	13:33
FK-ARS- 95-74	PM Fuel and Oil Filter	9:35	ARS- 7-75	Fire Control Instruments	
FK-ARS- 96-74	Test Equipment, TMs and the M151A2 (PM Indicators)	15:34	ARS-10-75	M48A1 Tank	12:18
FK-ARS- 97-74	Diesel and Multi-fuel Engines (PM Indicators)	9:16	ARS-13-75	Turret Power Operations	
FK-ARS- 98-74	Trailers (PM Indicators)	10:12		M48A1 Tank	11:47
FK-ARS- 99-74	PM Crew Served Weapons, 4.2" Mortar	5:53	ARS-14-75	Boresighting COAX Machine Gun	
FK-ARS-100-74	PM Crew Served Weapons, 106mm Recoiless Rifle	12:36		M48A1 Tank	9:30
FK-ARS-101-74	PM Small Arms M60 Machine Gun	5:57	ARS-15-75	Track Tension and Adjustment	
FK-ARS-102-74	PM Small Arms M16A1 Rifle	9:52		M48A1 Tank	7:55
FK-ARS-103-74	M17A1 Protective Mask	16:37	ARS-16-75	Before Operations Checks and Services M48A1 Tank	7:55
ARS- 1-75	PM Indicators and Inspection of Medical Sets, Kits and Outfits	12:30	ARS-17-75	Placing the Engine Compartment Heater into Operation M48A1	8:41
ARS- 2-75	PM Indicators Military Standard Engines	14:15	ARS-18-75	Cold Weather Starting M48A1 Tank	8:20
ARS- 3-75	PM Indicators Generators and Air Compressors	18:30	ARS-30-75	Modern Armor Battle	38:50

TOE-versus-MTOE. Frequently, personnel in the field are surprised to discover that the number of personnel and the type and quantity of equipment in their unit does not match up with the data found in TOEs or in the US Army Armor School Armor Reference Data, Special Text 17-1-1. The reason for this is that none of our units are organized under the basic TOEs as published. The basic TOE document prescribes the normal missions, organizational structure, and personnel and equipment allowances for type military units, and are the basis for authorization documents. TRADOC is the TOE proponent. School commandants, integrating Center Commanders and other Commanders having combat development functions assigned by HQ DA are the TOE

sub-proponent.

Based on a unit's real world assigned or anticipated missions, major commanders (FORSCOM, USAREUR etc.) develop modified TOEs (MTOE) using TOE as a blueprint. The MTOE document is a TOE which has been modified to add, delete, or change personnel positions and equipment items to meet the needs of a specific unit, or group of units, for employment in a particular geographic or operational environment. Recommended changes to TOEs should be forwarded through command channels to HQ TRADOC. Recommended changes to MTOEs should be forwarded through command channels to the major command that is the MTOE proponent.

Department of Army Publications. The Armor School **cannot** fill requests for DA publications submitted by field units. We can **only** supply Armor School publications. Although we do stock certain FM's, TM's, etc, these are for resident student use **only**. We are neither authorized nor staffed, nor are our stocks sufficient, to support field requests for these items. Please help us to help you — follow the correct procedures for requesting DA publications.

The correspondence subcourses listed below are now available. Individuals may obtain them by mailing a completed DA Form 145 to: The Armor School, ATTN: ATSB-TS-CC, Ft. Knox, KY 40121.

ARM 120 — Company/Troop Communications (Revised)

Communication responsibilities; means of communication; radio nets in the tank company and armored cavalry troops; and basic principles of radio transmission and reception.

ARM 121 — Communication Procedures (Revised)

Application of communication security; radio-telephone procedure; and content and use of CEOI extract.

ARM 122 — Communication Equipment and EMI (Revised)

Characteristics, capabilities, and operation of frequency modulated radio equipment organic to the tank company and armored cavalry platoon; employment of supplemental means of communication; antennas and field expedients for antennas; and electromagnetic interference and anti-EMI measures.

ARM 123 — STANO Devices and Employment (Revised)

Objectives of STANO; characteristics, capabilities, and limitations of selected STANO devices organic to or in support of battalion-size units; tactical employment of STANO equipment in combat operations; and monitoring of receiving devices.

ARM 139 — Military Instruction (Revised)

Planning instructions; preparation of lesson materials; selection and use of training aids; effective speech and questioning techniques; presentation of instruction, including demonstration and practical exercises; and test and evaluation procedures and critique.

ARM 150 — Small Arms (Revised)

Characteristics, general data, loading, clearing, and immediate action procedures for the Cal .45 pistol, M3/M3A1 submachine gun, M203 grenade launcher, and M16A1 rifle.

ARM 151 — Tank Gunnery-Materiel (Revised)

Armament, controls, and equipment of the M60/M60A1 tank; direct fire control system; field disassembly and assembly procedures of the 105mm tank gun; detection and correction of malfunctions, and tank gun ammunition.

ARM 154 — Forward Observer Procedures (Revised)

The mil and mil relation; target selection and call for fire; method of target engagement; and adjustment of fire.

ARM 158 — Night Vision Devices (Revised)

Description, general data, operation, and maintenance of night vision devices AN/PVS-2 (Starlight Scope), AN/TVS-2 (NVS, crew-observed weapons), and AN/TVS-4 (Night Observation Device — NOD).

ARM 163 — Bridge, Vehicle, and Route Classification (Revised)

Classification of vehicles, including standard single and standard and nonstandard combination vehicles; classification of bridges and routes; and application of the route classification formula.

ARM 522 — C-E Maintenance Management (New)

C-E maintenance resources available in a tank battalion/armored cavalry squadron; aspects of maintenance management peculiar to tank battalion/armored cavalry squadron C-E equipment; and C-E equipment inspection techniques using PM indicators to determine the equipment's PM status.

ARM 524 — Communication Planning (New)

Command and staff related responsibilities; the C-E planning process; C-E planning considerations, including communication criteria for command post site selection; analysis of C-E documents to determine applicability and adequacy to control C-E resources and support unit operations; and techniques for improving efficient use of C-E resources.

ARM 526 — The Army Electronic Warfare (EW) Program (New)

Objectives of the US Army EW Program; definition and concept of EW, including the three components of EW; source of EW support; staff responsibilities for planning and coordination of EW; signal security (SIGSEC) measures; SIGSEC planning; and support provided by the USA Security Agency.

ARM 569 — Movement to Contact (New)

Purpose, organization, and general techniques applicable to a movement to contact; planning and conduct of a brigade movement to contact; and actions and orders in response to changes in the enemy situation and to specific enemy reactions. □

CHIEF OF CAVALRY CHAIR PRESENTED TO MG STARRY



Major General Donn A. Starry (r) accepts the Chief of Cavalry chair from Colonel John R. Byers, the Armor Branch Chief.

Major General Donn A. Starry, commanding general of Fort Knox, was presented the Chief of Cavalry chair by Colonel John R. Byers, chief of Armor Branch, during a meeting of the US Armor Association Executive Council, 5 February 1975. The chair has great historical value for Armor, as it was occupied by the Chief of Cavalry from 1920 to 1942 and thereafter was retained in the possession of the chiefs of Armor Branch. With the dissolution of the individual Branch management chiefs, the chair will be retained and used in the office of the commanding general of the Armor Center.

CONSTRUCTION BEGUN ON TRANSPORTATION MUSEUM

Construction of new permanent Transportation Museum facility has begun at Fort Eustis, Virginia after a world-wide fund raising campaign received \$310,000 from contributions, only \$115,000 short of the \$425,000 goal.

The museum is being built in two phases. Phase I, the outside shell and foundation, was scheduled to be completed by April 1975 using the funds already collected. Phase II, which includes the air conditioning, auditorium, covered exterior display area and

other items to complete the museum will be contracted when additional funds are raised. Inquiries may be addressed to the Transportation Corps Museum Foundation, Box 645, Fort Eustis, Virginia 23604.

ARMY DEVELOPS WHEEL-TRACK VEHICLE

US Army Tank-Automotive Command (TACOM) engineers have developed and successfully operated a unique vehicle that can be used either as a wheeled or a tracked vehicle.

Called the wheel-track convertible test rig, the vehicle is a high-mobility tactical vehicle designed to carry a three-quarter-ton cargo. The rig weighs 5,600 pounds (6,700 pounds with tracks installed) and is equipped with eight gear-driven wheels. It can travel over paved roads at a speed of 55 miles per hour. With tracks installed it "crawls" cross-country at speeds up to 35 miles per hour.

To convert the vehicle from wheels to tracks, four band tracks are installed. Each fit snugly around two of the vehicle's tires. Three men can convert the rig from wheels to tracks in less than one hour. When installed, the tracks enable the vehicle to traverse soft soil and snow.

The rig is currently undergoing tests and modification at TACOM. It will then be subjected to troop evaluation. The wheel-track convertible test rig is still several years away from mass production and becoming a part of the Army's vehicle fleet.



The wheel-track convertible test rig takes a hill during recent tests.

BELLAMY PARK

by Bradford G. Chynoweth. Exposition Press. 301 pages. 1975. \$10.00.

General Chynoweth has written before for *ARMOR* and is known for telling it like it is. In this little volume, his autobiography up to his reluctant surrender in the Philippines, he tells it like it was in the Army's lean years.

His life spans a considerable chunk of our country's history. When the author was born in 1890, his father commanded an Indian scout troop in Wyoming. The family later moved to Bellamy Park, a quarters area at Columbus Barracks, Ohio where young Chynoweth first appreciated military life and the impact on history made by military men. His story takes us through early Philippine duty, World War I, Army life in the '30s — including some unusual glimpses of Eisenhower, MacArthur and Patton, the foreboding prelude of World War II, and organizing guerrilla warfare in the Philippines.

General Chynoweth admits to being blunt, forthright, stubborn and occasionally tactless, suspecting that others saw him as "an unbroken colt". That picture comes through time and again as he decided what he perceived to be the best course and pursued it relentlessly and heedlessly, bloodying his nose consistently. The chronicles of his run-ins with his superiors are remarkable if for nothing more than the numbers! He confesses that "I am writing this book partly as a psycho-analysis of my own eccentricities which caused me so much stumbling."

Yet Armor can count itself lucky that there were men like Chynoweth around to beat the drum for Armor, for new doctrine, better equipment and realistic training. He was one of the very few who early visualized the incredible advantages of Armor and pressed for their exploitation. Somewhat fruitlessly, unfortunately. He trained for battle, driving his men hard and cutting away the frills. He probably was neither a friendly nor popular man, but I'll bet every soldier who worked for him was proud of his tough, hard-nosed, uncompromising commander. (And many who later survived owed their lives to his demanding integrity.) He believed that decentralization of responsibility was essential in training young leaders

and this theme recurs throughout the book. So, also, do his acid comments and criticisms of many senior officers who did not perceive the nation's needs as clearly or as promptly as he did.

This is not an easy book to read. General Chynoweth writes in a staccato rhythm of short sentences and disconnected thoughts, jumping abruptly from one subject to the next. But once you're used to that, it's a gem, a real find for historians and military buffs alike. And, for the young Armor troop leader just getting used to his bars, this story has some solid, profound thoughts on how to treat soldiers and lead men.

Colonel John R. Byers
Chief, OPD-AR

THE BORMANN BROTHERHOOD

by William Stevenson. Harcourt, Brace, Jovanovich. 334 pages. 1974. \$7.95.

Since his controversial disappearance from Hitler's command bunker in Berlin during the final days of World War II, Martin Bormann has been reportedly "seen" in South America, Russia and various other countries throughout the world. For 30 years the mystery surrounding the shadowy figure of Hitler's deputy and Nazi Party Minister has grown.

Was Bormann killed during his escape attempt, or was he taken captive by the Russians? Could he have eluded the Russian cordon around Berlin and made his way safely to parts unknown? William Stevenson, who has conducted a one-man search for Bormann since 1945, addresses these questions in this rambling, unstructured, sometimes confusing account of his investigative experiences on the trail of the only person tried (and convicted) *in absentia* by the International Military Tribunal at Nuremberg.

Though he never comes right out and says it, Stevenson believes that Bormann is still alive, probably somewhere in South America. His rush to judgment, however, following interviews with several unidentified, as well as identified, persons is studded with conjecture, innuendo and supposition. The findings are, like Bormann's whereabouts, uncertain.

According to Stevenson, Bormann

was the real brains in Germany, a master puppeteer with Hitler on the string. Exploiting Hitler's sexual weaknesses, Bormann created a stranglehold on Hitler's empire during the war and laid careful plans for the perpetuation of Nazi doctrine after the war by establishing "*Die deutsche Gemeinschaft*", the German Brotherhood. Toward this end Bormann set up the elaborate "Odessa" system which enabled countless German war criminals to escape with ill-gotten wealth to sanctuaries throughout the world. Stevenson further asserts that Western governments, including Bonn, have succored the Brotherhood by failing to hunt down the war criminals wherever they were found. For those Germans sentenced to prison for war crimes, their loyalty to the Brotherhood was rewarded, according to the author, by prosperous business offers upon release from confinement.

Where fact ends and conjecture begins is difficult to ascertain, however, since the author, a professional journalist, has left much of his story undocumented. Discretion must be applied by the general reader.

In addition to the Brotherhood, Stevenson's narrative contains some fascinating glimpses at little-known vignettes of World War II: the plots to kidnap the Pope and assassinate Stalin, the largest forgery operation in history and the activities of the German "Werewolves" are among the most spectacular.

While Stevenson's story-telling ability cannot be faulted, his historical efforts are less than satisfactory.

Lieutenant Colonel John G. Fowler, Jr.
USACGSC

NO SURRENDER: MY THIRTY-YEAR WAR

by Hiroo Onoda. Kodansha International Ltd. 219 pages. 1974. \$7.95.

Lieutenant Hiroo Onoda is an extraordinary soldier who last year ended the longest war fought by an individual in modern times. His account spans a 30-year period in which he carried out orders he received in the waning years of World War II.

No Surrender is a fascinating book which deals not only with the individual, but also shows the necessary

cultural background which enabled Lieutenant Onoda to carry out his orders. Many who will read this book will have mixed feelings toward the man who experienced it, and the remembered savage total warfare conducted by the Imperial Forces of Japan. While Lieutenant Onoda was trained and possessed the necessary discipline to conduct the conventional role of a Japanese soldier of the period, he also possessed a high degree of integrity. This trait, above all others, enabled him to carry on for so many years.

The war which Lieutenant Onoda fought for so long however, was quite different from warfare which the reader normally experienced. His war was waged on an island from which escape was virtually impossible, but more importantly was not a part of his orders. The island of Lubang is located southwest of Luzon in the Philippines. It is a long narrow island about six miles from north to south and 18 miles from east to west. On this small piece of real estate, Lieutenant Onoda and comrades were to wage their "longest war."

What must be remembered when reading *No Surrender* is that Lieutenant Onoda was sent to Lubang Island to wage "guerilla warfare", and not to die or surrender. These orders are quite different from those normally distributed to Imperial Forces of that time. Lieutenant Onoda's ability to carry out those orders to the degree that he did was remarkable. As an intelligence officer, Onoda had the drive and training to conduct his special task and, in addition, he was able to lead others with him to continue the long struggle.

Lieutenant Onoda's personal account of those 30 years includes those comrades who stayed with him and endured the hardships and constant manhunts to kill or capture them. There are many ironic events scattered throughout *No Surrender*, and the reader will again and again marvel at Lieutenant Onoda's tenacity when overwhelming evidence introduces itself that the war was over; that friends and close relatives were in his vicinity beseeching his giving up and coming home; and the loss of his comrades one by one, until he is finally on his own.

The final irony of all is what made Lieutenant Onoda endure all the agony and hardship over 30 years. The simple cause is soon revealed in the opening chapters of *No Surrender*, and yet is the dominating factor throughout 30 years of his life. Normal men would long ago have given up in the face of such hardships and lost causes, but Lieutenant Onoda's integrity kept him there.

There are numerous lessons to learn

from Onoda's book on survival techniques, and many readers will recognize the value of them. *No Surrender* offers a "real life" drama full of suspense, tension and the excitement of danger, coupled with man's indomitable will to survive. *No Surrender* is well worth reading.

Major Charles E. Griffiths
AUS-Retired

ALLEN: THE BIOGRAPHY OF AN ARMY OFFICER

by Lieutenant Colonel Heath Twitchell. New Brunswick: Rutgers University Press. 358 pages. 1974. \$12.50.

The period between the end of the Civil War and the start of World War I was a time in limbo for the American Army. Few people today appear interested in a time of only minor Indian skirmishes, isolated outposts of small army units and a general neglect of the American military. Unfortunately, this period contains the origins of today's Army — seeds which are vital to the understanding of the modern military organization. Additionally, the period covers the expansion of the Army from an insular force devoted primarily to internal security to a force of over 30 divisions engaged in a world conflict. Finally, the period marks the transition of the Army from involvement only in military affairs to participation in civilian actions as well.

Colonel Twitchell has taken the biography of one man, Major General Henry T. Allen, and used it as a vehicle to mirror the military society of this time. Allen's career, from 1872 to 1923, closely followed the society of which he was a part. Beginning as a lieutenant in a regiment engaged in maintaining order among the Indians of the West, Allen was subsequently an explorer in Alaska, counter-guerilla leader and civil administrator in the Philippines, military attache to the courts of Russia and Germany, division commander in World War I and finally the commander of the American occupation forces in Coblenz following the war. It is obvious from these diverse assignments that the Army's role was constantly changing, and its officers' careers reflected the change.

Another picture that emerges from the biography is that of an army deeply ingrained with political favoritism. Allen, like many others that eventually rose to prominence, knew how to use this trait to his own advantage. He

conducted a virtual campaign to obtain the post of attache in St. Petersburg, and used the help of Theodore Roosevelt, General Miles and the governor of Kentucky to be assigned as a battalion commander in the suppression of the Moros in the Philippines. This trait of using political "pull" was obvious, especially to those whom Allen passed or outshined. One of his commanders wrote an efficiency report that said Allen was "a virile, energetic, intelligent officer who never loses sight of his own interest." But as time passed, the Army gradually eliminated this trait of political influence and manipulation by officers to further their own careers. Strangely enough, although he had constantly benefited through patronage, Allen recognized the liabilities of such a system and worked hard to replace it with one based on merit rather than seniority or political influence.

This biography is a living picture of a period of Army history that has for too long been obscured. It is also an interesting tale of a fascinating man, who rubbed shoulders with the historical figures of this time. Finally, it is a detailed portrait of the lives of the soldiers of those "forgotten years" between America's last great internal conflict and her emergence as a world power.

Captain Frame J. Bowers III
Princeton University

CIVIL-MILITARY RELATIONS

Edited by Charles L. Cochran. The Free Press. 366 pages. 1974. \$10.95.

Civil-Military Relations is a textbook analysis of the military role in a world where preparation for war is commonplace. The book consists of 14 chapters written by 12 present or former members of the Political Science Faculty at the Naval Academy. The first part of the book examines relations in the United States starting with the Constitutional intent and examining civil rights-versus-military necessity, civil-military aspects of formulating foreign policy, the defense budget, the effects of the Naval Academy on midshipmen, the changes in civil-military relationship as a result of the Vietnam War, the press and national security and the role of the Reserves and National Guard. While there is every effort in the United States to build a separator between the

civilian and military elements, the conclusion is drawn from part one that the traditional dualism between the civilian and military parts of society "is not appropriate for the contemporary context."

The second part of the book examines civil-military relations abroad. This part includes chapters in Sub-Saharan Africa, Latin America, North Africa, Peoples Republics of China and Indonesia, and the USSR. Except for the USSR, these are developing countries and the problems are different from those of the United States. In these countries, the major difficulties concern internal organization and the modernization of forces; therefore, there is a great tendency to use the military in nation-building tasks to aid in the economic and social development of the country. This type emphasis places the military in the position of being more interested in national development than national defense.

This is an interesting book that should be recommended to political scientists.

*Lieutenant Colonel Carl M. Putnam
HQ FORSCOM*

BRINGING THE WAR HOME

by Dr. John Helmer. The Free Press. 346 pages. 1974.

Bringing the War Home is a scholarly study of a group of enlisted men who served in Vietnam by John Helmer, a Ph.D. in Sociology from Harvard. The work contains extensive facts and figures. There are 275 tables contained in the 299 pages that make up the body of the work.

The author initially discusses the Vietnam draft. He believes that working class men were more likely to be drafted than were men of the middle or upper classes due to a procedure known as "channeling." Helmer also believes that blacks were more likely to be sent to Vietnam than whites.

Helmer states that all enlisted men (E-1 to E-6) could be put into one of two groups while in Vietnam: either the "heads" or the "juicers." Helmer divided his sample into three 30-man groups: the "straights," the "addicts" and "heads." Helmer attempts to show that the "straights" of his sample were in the "juicer" group in Vietnam, while the "addicts" and the "radicals" belonged to the "head" group. Drug abuse, discipline, morale and attitude toward the Vietnam war are among the major points investigated by Helmer.

The idea of group solidarity plays

a major role in Helmer's book. He attempts to show that the solidarity of the "heads" in RVN caused many leadership problems for commanders at all levels. These attitudes of the "heads" were manifested by incidents such as mutinies and fraggings. Helmer makes many references to Marxism. Marxist principles are footnoted on many occasions to relate to the processes a group goes through en route to a revolution.

A major objective of the author is to determine whether the strong resentful attitudes of the "heads" in RVN remained with these veterans upon their return to civilian life and if so, whether these attitudes could be strong enough to cause a Marxist-type mobilization or even rebellion by the radical veterans. Helmer examines the established groups available to the veteran, such as the American Legion, the Veterans of Foreign Wars (VFW) and the Vietnam Veterans Against the War (VVAW) in an effort to see what influence they have on the veteran's attitudes. The author concludes that the idea of mobilization by a group of radical Vietnam veterans is not realistic at all. Fraternity may be the only tie remaining with this group today.

The work is an interesting one and definitely worth the time for the determined reader.

*Captain Douglas H. Madigan
Armor Officer Advanced
Course — 1975*

THE CANNON'S MOUTH: THE ROLE OF US ARTILLERY DURING WORLD WAR II

by Lewis J. Gorin Jr. A Hearstone Book. 286 pages. 1973. \$7.95.

The introduction to this account of artillery application contains the following passage: "At the conclusion of World War II, US artillery representatives from all theaters were assembled at the Artillery Center, Fort Sill, Oklahoma, for a conference. General George S. Patton charged this conference with the words: 'Look carefully at what you did, and how you accomplished it — cull what you think you did.'"

This book could be considered as meeting the above challenge by General Patton. The author was one of the first officers to join the 6th Field Artillery Group, the unit traced through these writings. He served with it

through its campaigns in Africa, Italy, France and Germany. Much of his writings are first hand observations, including details as to times, dates and places, all supported by direct quotes, operations orders, overlays, etc. Also of major significance is the amount of factual data contained in this manuscript such as missions fired in various actions broken down into types, (i.e., observed, unobserved, counter battery, interdiction, harassing, etc.) and number of rounds by types that were fired. The 6th Field Artillery Group was a non-divisional unit and as such, this material must be kept in that context, as its missions were more of a general support rather than of direct support application. Of significance is the fact that this organization contained every caliber of artillery utilized during World War II, from the 75mm pack howitzer to the 240mm gun. As one reviews the above collection of data and factual information, many lessons become very evident, lessons that have been relearned in later conflicts and that can be traced back through previous encounters. One of the most interesting facets in this area is the significant utilization and reliance placed on the Artillery Aerial Observer in his Piper Cub. As the war neared its end, the German Army was almost restricted to movement only at night and during periods of reduced visibility as the use of aerial observation was so effective. Its use as an intelligence gathering source played a significant role. This book provides the factual data to support the increased role of aerial observation on the battlefield. The author fully supports his contention that: "Piper Cubs (as observers for artillery) proved more effective in defeating Germany than any other single plane." Cited were such outstanding examples as Mannheim, Cassino and the German-Italian rail connection.

All those interested in the factual, detailed history of World War II and all those involved in planning and preparing our army for future encounters will find this book most enjoyable and in many aspects extremely useful to insure the experiences of that conflict are applied and not relearned. Factual data contained therein can be most useful to provide supporting rationale for the effectiveness of artillery as well as the absolute necessity for timely acquisition of targets on the battlefield.

*Lieutenant Colonel John F. Zugswert
RED Team Member
Scout Helicopter
Special Task Force*

□

May - June

Coming in **ARMOR**

"Let's Do Something With the Cobra"

Lieutenant Colonel David Funk discusses what is needed to keep the "bread and butter" AH-1G Cobra viable while the "wild blue yonder boys" are busy advancing the state of the art and building enough AAHs and TOW/Cobras to fill the existing requirements.

"Map Manuever '75"

Captain Ernest L. Childs applies computer technology to the old CPX/MAPEX format and comes up with a system which is realistic, simple to set up and gets the entire staff involved. This system, Map Manuever '75, is being used in the Armor Officer Advanced Course at Fort Knox and will soon be available to all units within 3,000 miles of Fort Knox via leased telephone lines.

"The Balanced Combined Arms Battalion — An Alternative"

Tailoring of units to fit individual missions is a problem for which several recent articles have proposed solutions or at least simplifications. Captain Duncan F. Stewart combines several of these proposed systems into a balanced combined arms battalion and analyzes it in several types of operations.

"European Tactical Missile Systems"

Christopher Foss, noted for his articles and books on weapons, analyzes the various missile systems which are being developed by Western European countries. The systems are discussed in terms of type, capability, engagement methods and transportation requirements, as well as being compared to American weapons.

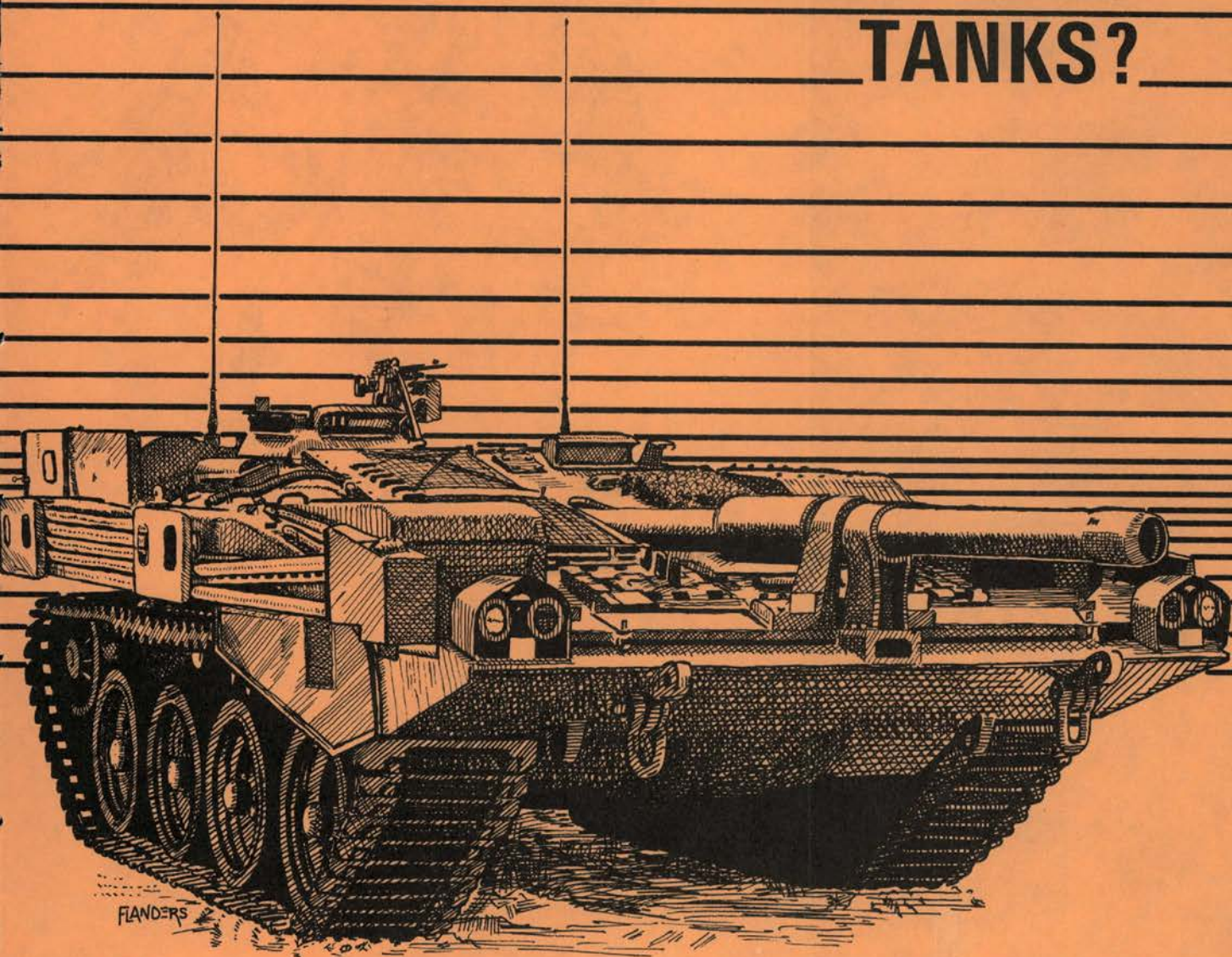
"Turretless Tanks"

The lessons learned from the World War II and postwar tests of turretless vehicles are examined in light of the successful development of the Swedish S-Tank. The advantages of similar systems and possible improvements over the S-Tank are detailed by Richard Ogorkiewicz, internationally known engineer and lecturer.

ARMOR

july-august 1975

TURRETLESS TANKS?



Swedens's S-Tank

US Army Armor School

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"To disseminate knowledge of the military arts and sciences, with special attention to mobility in ground warfare; to promote professional improvement of the Armor Community; and to preserve and foster the spirit, the traditions and the solidarity of Armor in the Army of the United States."

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Cover

Sweden's turretless Strv 103, or S-Tank. The characteristics of the Swedish embodiment of the turretless concept, which are drawing more intense scrutiny from the international armor community, are pointed to by noted authority Richard M. Ogorkiewicz in "Turretless Tanks?" beginning on page 13. (Illustration by Steven Flanders)

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LETTERS

Silver and Gold

Dear Sir:

I enjoyed "Why Silver Ranks Gold" in the March-April issue. I found this piece on the subject the other day.

The Legend of Army Ranks

There is a legend which connects the symbols that designate the ranks of Army officers with the world around us.

Precious metals are found deep in the ground, gold occurring below silver. The lowest ranking officer, the second lieutenant, is known by a gold bar, while the man who is one notch above him, wears a silver bar. Two silver bars are then used for the next higher rank, the one of captain.

As we rise above the ground, the earth is covered with trees. Thus, the rise in the Army echelon to major is symbolized by a gold oak leaf. The next promotion, that of lieutenant colonel, is logically designated by the silver oak leaf.

About the trees fly birds. Thus a full colonel wears an eagle. And, last in this listing but first among officers are the generals. Their symbols are stars, quite suitably, the highest objects in heaven.

JOHN A. REICHLEY
Major, GS

Fort Meade, Maryland 20755

Cavalry Platoon Organization

Dear Sir:

I was greatly disturbed by the new cavalry platoon organization as presented in the Commander's Hatch in the March-April issue of *ARMOR*. Since I have been associated with armored reconnaissance, I have held that a scout who has to fight to gain information is a failure; and a cavalry platoon structured to fight will depart on a mission intending to fight, and negate its mission. A reconnaissance element spoiling for a fight will not only inform the enemy of its presence and inform him that he has been observed doing whatever he had been doing, but might also initiate the major battle prematurely.

There is also danger in the sheer strength of the platoon, and thus of the squadron. A division commander will have a divisional cavalry squadron at his disposal consisting of 36 battle tanks,

18 antitank missile launchers, and 27 cannon-armed personnel carriers; and will view it as another line unit. The tendency of division commanders to use their cavalry elements as line units has already been seen in some *REFORGER* operations; the proposed cavalry organization will undoubtedly encourage this even more.

Whatever the fighting — or non-fighting — intentions of the cavalry platoon, I believe that the battle tank has no place in it. The *M-60*-series battle tank is simply too big and too heavy to operate with the flexibility required of cavalry platoons. Many cavalry operations in Europe are managed solely through the office of their vehicles being narrower and lighter than those of the armor battalions. Narrow village streets and marginal bridges, now sources of refuge and salvation to the hard-pressed cavalry unit, would be denied to the proposed cavalry platoon. The *M-60*-series battle tank being heavier than its Russian opposite number, the proposed cavalry platoon could be presented with the fatal embarrassment of enemy tank units utilizing bridges denied it. The *M-60*-series battle tank also has a complete inability to cross deep water obstacles without extensive preparation and thus will again hamper cavalry operations. The Commander's Hatch seemed to hint that the *Sheridan* will not be with us much longer. If true, the *Sheridan* should be replaced by a vehicle with at least equal mobility and flexibility, not less.

The introduction of the *M-113A1* as a scout vehicle has its advantages. It is a more successful automotive design than the *M-114*, perhaps the best tracked automotive system in the Army, but it is awfully bulky for a scout. I was quite impressed with the *M-113CR* (*M-113 1/2* or *Lynx*) in the hands of the Canadians in Germany; wouldn't this be a more suitable vehicle? I also don't believe that the *TOW* missile system belongs in a cavalry unit until it can be fired and guided from under armor protection.

One comment about the proposed permanent consolidation of the mortar squads at troop level. The present 4.2-inch mortar has a range of 5,650 meters; with new proposed ammunition, it will range about 6,700 meters. With the usual and necessary deployment of the mortars 1,000 meters behind the FEBA, and a troop front common to Europe of 12 kilometers, the consolidated mortar section will only be able to support the

center platoon, leaving the flank platoons without any indirect fire support.

The proposed cavalry platoon seems to take a step away from reconnaissance and scouting in general. The old cavalry platoon has five support vehicles and one command vehicle for four scouts. The proposed platoon will have one command and six support vehicles for two scouts. Why not more scouts? Scouts are why we have cavalry platoons. Scouts pull the reconnaissances, and play major roles in screening and security missions. Rather than the proposed cavalry platoon, how about a platoon with three squads of two scouts each, *Lynxes* perhaps, and an armored section of three *Sheridans* or its successor. Retain the platoon leader in an *M-113A1* and have platoon-level indirect fire support from either a heavy mortar or a light SP howitzer of the Abbott type.

I am perhaps prejudiced by my experience, but European light armor developments — Britain's *CVR(T)* family, France's new *Panhard* and *AMX* armored cars, Germany's 8x8 *Spahpanzer* and Russia's *M-1970* light tank — indicate that the European military feels that a light vehicle, intended for scouting more than fighting, is the proper vehicle for the armored reconnaissance unit. An armored cavalry unit should fight, granted, but as an unavoidable development, not an intention. I think we're off base on this one, and that this proposed cavalry platoon will not be cavalry's advancement, but rather its demise.

PETER L. BUNCE
Staff Sergeant

Fort Knox, Kentucky 40121

Tank Gunnery Discussed

Dear Sir:

I read with interest the correspondence in reference to Lieutenant Colonel Bahnsen's article on tank gunnery. This is my specialty in the Royal Australian Armoured Corps. I was a gunnery instructor at our Armoured Centre for six years, and I am always ready to "bend an ear" when I find one willing to be bent!

Firstly:

GUNNERY is the *raison d'être* for tanks. IF THE GUNNER CANNOT DESTROY THE TARGET, ALL YOU HAVE IS A 50- (or whatever) TON TRANSISTOR RADIO!!! Note I use "destroy" in place of "hit" for reasons

that all who have commanded a tank will appreciate. The entire chain of people from the ammunition depot storeman, through the gunnery instructor via the tank commander is in existence solely to place the gunner in a position from which he can destroy targets!!

Secondly:

APDS shooting has always been a *bete noir* of mine. Several techniques have been discussed and tried in my Corps, and the one which I consider to be the most effective is that which I call the "instant correction" method. To explain:

The effects of firing APDS are considerable; observation by the gunner is 99 percent nil and by the commander 98 percent nil unless conditions of observation are excellent. To overcome the effects of firing *and insure a hit*, the gunner fires one round with a central lay, and a second at "top edge." The fire orders are:

COMMANDER	GUNNER
RANGING	
SABOT TANK	
(Manipulates his control and lays onto the target using a common point of aim)—ON	(having identified the target)—ON
FIRE	FIRING NOW—(instantly)—TOP EDGE
FIRE	FIRE (having laid his point of aim onto the top edge of the target) FIRING NOW

If the commander sees the first round strike, he can order *SAME LAY-FIRE*; if not sure, he merely orders *FIRE* a second time, and the gunner completes the technique. Now, the 90 percent probability zone for the 10-mm L-28A1 round at 2,000 meters is 1.2 meters x 1.2 meters; that is to say, a circle of radius .6 meters (23½ inches) into which 90 percent of rounds will fall. (I think they do the round injustice—the figure should be 99 percent, I feel). To allow for the "rogue" 10 percent of rounds, barrel droop, "gunner twitch," propellant temperature, bore wear, individual projectile differences, slack in elevating gear and all other "fudge" factors, this two-round technique insures a hit. You don't have to *think* — you just do!!

Note that this technique applies to APDS only. Oh, and of course the gunner does the ranging on *Centurion* (which we *still* have), and *Leopard* (which we will obtain soon?).

As Major Stanley Wilson (*ARMOR*, January-February, 1975) says, a T-62 turret is only 24 inches in height; but I have read this technique hundreds of times, and unless you go very wrong you WILL hit. Of course, this is not official Royal Australian Armoured Corps doctrine.

Thirdly:

As Major John Waters (*ARMOR*, January-February, 1975) intimates, no one fires enough — the ONLY way for a tankie (ours) or tanker (yours) to become proficient at gunnery is to SHOOT, SHOOT, SHOOT; and it must be live ammo, on a decent range that gives all types of targets at all ranges; NOT the restricted-range, restricted-arc, restricted-target type of range with which we all seem to be deviled.

Fourthly:

(And this will probably have me hung from the nearest 105 barrel); when, oh when, are you going to stop putting a cupola on your vehicles' turrets to allow the commander to have his own little war? Rip them off, give him a .50 caliber machinegun which can't be depressed below 20 degrees and let him get on with the business he is there for — commanding the crew!!!

Fifthly:

Thank you for your time and patience!!!

N. J. MODYSTACK

Warrant Officer Class 1

Albury, NSW, Australia

Air Defense System

Dear Sir:

The article *Antiaircraft/Anti-Antitank Missile* by Colonel John P. Berres which appeared in the opinion section of your January-February 1975 issue was read with a great deal of interest here at the Air Defense School (USAADS). Colonel Berres had most of his rounds right on target.

I do want to point out, however, that air defenders here at the School are not totally enraptured with the aircraft killing missile. In fact, the Air Defense School has been aware for some time that a new gun is needed; for the *Vulcan*, in addition to other shortcomings, is extremely short-ranged. It was originally fielded as an "interim" system but, like many other "interim" systems, is proving quite difficult to retire.

There is a divergence of opinion on just how the maximum effective range

for an air defense gun system is defined. Many times overly optimistic ranges, such as tracer burnout range, or ranges at which the projectile becomes unstable are cited as maximum effective ranges. In general, the Air Defense School uses that projectile intercept range at which a burst has a good probability of achieving a kill as a measure of effective range. Because effective range is influenced not only by the ballistics of the projectile, but also by its lethality and the system fire control, the Air Defense School considers the *Vulcan* to have a greater maximum effective range than a .50 caliber machinegun.

Recognizing *Vulcan's* deficiencies, USAADS has been working on development of a new division air defense gun (DIVAD Gun) for over a year. We have been following carefully the evaluation and testing of the best of the foreign systems, while working on the DIVAD Gun requirements. During this time, the idea of trying to update the old *Duster* to meet current requirements was considered, but quickly dropped after determining that it would need a new fire control, new chassis, new turret, and at least a modification of the guns and ammunition to give us a faster rate of fire and the projectile times of flight necessary to achieve the desired hit probabilities. Were we to go that far we would have not only designed a new gun system, but one that would not necessarily be optimum; and as I have noted, we have been down the "interim" road before.

We believe Colonel Berres is right on target when he states the requirement for an air defense gun system that can accompany armor into battle. Historically, self-propelled (SP) air defense guns have been used where ruggedness and mobility are the key requirements. This is not to say that an SP missile system could not also be made as rugged and mobile; however, to date this has not been accomplished. Moreover, the added dimension of a gun system that can defend itself and make a firepower contribution, even in the absence of an aerial threat, makes it more suitable than a missile system for integration into the combat maneuver forces during highly fluid or mobile-type operations.

As envisioned by USAADS, the DIVAD Gun will be mounted on a full-tracked vehicle such as the MICV or a main battle tank chassis and will have a completely enclosed turret providing armor protection similar to that of the supported force. Its fire control system will be built around a digital computer with both radar target acquisition and tracking. The armament will be on the

order of 30- to 40-mm. This sophisticated system will be able to take on the stand-off helicopter threat out to ranges in excess of 3 kilometers, as well as high-speed, close-support type aircraft. In addition, there will be an optical back-up system that will permit the DIVAD Gun to engage ground targets as a secondary or self-defense measure.

Developing a new air defense gun is a very complex problem. An example of the difficult trade-offs involved is the selection of the optimum caliber cannons. The larger calibers allow greater range and lethality but limit the rate of fire and ammunition storage. The target spectrum runs the gamut from high-speed jets, to helicopters, to ground targets. Of necessity, the engagement of ground-based threats must be a secondary role for air defenders, and one which does not interfere with their primary mission. The limited number of air defense fire units within the division forces the commander to utilize the air defense guns primarily for air defense, rather than for direct fire against ground targets.

Although our DIVAD Gun development program is still in the paperwork stage, it is gathering momentum. Recently, TRADOC and AMC signed a Letter of Agreement (LOA) to build two test beds. As soon as DA approves the LOA, steps can be taken to solicit proposals from industry. USAADS has been working closely with both ARM-COM and industry, and has determined that at least two test beds are necessary to answer those questions that cannot be answered by studies. For example, the test beds will help decide which is the optimum caliber for the system and provide an opportunity to evaluate different contractor approaches.

We at USAADS have been pleased with the strong support from the Armor Community that has been forthcoming over the past months, and I trust this letter will arrest the concern of those tankers who may believe that the air defenders have become so enraptured with missile systems that they fail to recognize the utility of a gun air defense system.

W. ARTHUR RUSSELL, JR.
Major, Armor
Fort Bliss, Texas 79916

Reader Discusses "Commander's Hatch"

Dear Sir:

Recent articles under the Commander's Hatch title in *ARMOR* have proved to be very interesting and instructive to

this ex-naval officer. Emphasis on the overwatch section appears to be for surface threats, yet enemy helicopter and ground-attack aircraft will form a significant threat to allied and U.S. forces in future wars. *Vulcan* and *Chaparral* units provide some formal protection with *Redeye* sections being used for close-in protection against air threat. Since, as the article "Air Defense for Armored Leaders" (March-April 1974) indicates, the lowest level at which the *Redeye* sections are located is the battalion level, it is entirely conceivable that a unit may well have to fight without air defense organic to itself other than turret or APC mounted machine-guns. The machinegun is more useful for antivehicle and antipersonnel functions than the demanding task of hitting a maneuvering aerial target.

My modest suggestion involves the placement of a *Redeye* launcher on the turret roof of at least two of the vehicles in a tank or APC section adjacent to the loader's hatch. Leaving the commander of the vehicle free for his other tasks, this arrangement would allow some organic antiaircraft defense similar to the German World War II philosophy of providing many units with the *Panzerfaust* for personal antitank protection. Whether the loader will have to stand on top of the vehicle or can fire from the open hatch will have to await troop tests. Training requirements will be minimal as the loaders of a tank or APC section need only attend a basic course in the operation of this weapon.

My suggestion may not be valid, some other means of providing basic organic air defense for units not accompanied by *Redeye* or other, more formal, air defense weapon units may be needed. At least the use of *Redeye* by personnel within the unit is fairly inexpensive and requires none of the development or purchasing of complicated light cannon and sights to be able to hit the helicopter or the ground attack aircraft.

GORDON J. DOUGLAS, JR.
Mechanical Engineer
La Habra, California 90631

"Evaluation of OER"

Dear Sir:

I found the opinion article "An Evaluation of Officer Evaluation Reporting" by Lieutenant Colonel Clary very interesting and thought-provoking. I am sure that much has been said and will continue to be said on the subject of evaluation reporting and the inequities and problems, and over-inflation will

continue. However, I think it is time that the Army gave serious consideration to management by objectives (MBO). We can insure performance by putting objective needs into personal goals and the individual would have more self-control on harmonizing his goals with those of the organization.

Our current problem in OER is that we are comparing individuals with their contemporaries, but not with themselves and the accomplishment of their goals.

Our system doesn't allow for mistakes by an individual and anyone who does transgress is forever penalized for what has happened.

The measures that Colonel Clary has presented are valid and should be considered and hopefully improvements can be made to our evaluation system.

ARTHUR WILLIAMS
Captain, USAR
Little Rock, Arkansas 72204

"Motorcycle Scouts"

Dear Sir:

My first reaction to Captain Cecil Green's "Motorcycle Scouts," (*ARMOR*, March-April, 1975) was: "What does that young whipper-snapper know about the use of motorcycles as reconnaissance vehicles that the Army does not already know?" By the time I finished the article, he had me convinced that there is a definite need for cross-country, solo motorcycle scout platoons in today's modern Army.

As a first lieutenant of Cavalry, I was a platoon leader in the experimental "motorcycle troop" ("G" Troop), Sixth Cavalry, in 1940. This vroom-vroom group was commanded by the late Brigadier General Charles Penoyer Bixel. We utilized the big Harley-Davidson solo cycles and the three-man Harleys with buddy seats and side-cars. We were the hot-rodders of the early forties!

As long as we had good roads we could get there "fustest with the mostest." It was a great experience. All I have to show for it is a dislocated right shoulder, which now serves as a weather forecaster. Yup, one of them "well over 600-pounds" Harleys got all over me on Wilder Field in Chicamauga Park, Fort Oglethorpe, Georgia, back in the good old days.

Since they are not about to give us back the horse, the next best thing is the lightweight trail bike. I salute Captain Green for his fine article.

GLENN E. FANT
Colonel, AUS-Retired
Fairfax, Virginia 22030



THE COMMANDER'S HATCH

MG DONN A. STARRY
Commandant
US Army Armor School

TANKS FOREVER

Everyone is talking about tanks.

Armor soldiers — users of tanks, examining modern battle, view the tank as a multipurpose weapon with a variety of essential combat capabilities. The October War confirms their views, and demands improvements in tank capabilities. Other observers — budget analysts, antimilitarists, skeptics — for a variety of reasons, view the tank as an anachronism, a system rendered useless by recent advances in numbers and effectiveness of long-range antitank systems. The October War, they say, suggests that tanks can now be replaced by large numbers of antitank guided missiles (ATGM's).

Are tanks necessary, or are they not?

In answering this question, two things must be said.

First, modern war is a contest of measures and countermeasures. For every modern weapon system, there is an effective countersystem. For aircraft, there are surface-to-air cannons or missiles; for tanks, there are other tanks and ATGM's; for artillery, there is counterbattery; for infantry, there is direct and indirect fire suppression by tanks and artillery.

It is quite like the children's game of "rock, scissors, and paper." Rock breaks scissors, which cut paper, which, in turn, covers rock. The goal in battle is to apply the tactic which best utilizes the capabilities of each battle system, while minimizing its vulnerability to countermeasures. As in the "rock, scissors, and paper" game, a mixed strategy enables a win. We do not refuse to play the game just because each tactic has an effective counter.

Armor soldiers have never viewed tanks as a self-contained battle system, tanks have always been a part — an essential part — of the combined arms team. We learned this lesson at Cambrai; it has been reinforced by every tank engagement since. No one denies that on today's battlefield, unsupported tank attacks face mass destruction from accurate and lethal ATGM's, as well as from other tanks.

Therefore, the question really is — are tanks a necessary part of the combined arms team?

Second, tanks were created in an attempt to restore mobility to battle, enabling the side using them to seize the initiative from the enemy. Tanks were the first element of the combined arms team to become other than foot or horse mobile. However, the essential lesson of the need for and value of

mobility as a means to seize initiative was drawn from lessons history taught about the effectiveness of mobile cavalry, dragoons, horse- or elephant-mounted infantry in battle. Therefore, the question really is — are tanks necessary as a part of the mobile weapon combination to seize battle initiative, or can some other systems do the job?

How, in modern battle, would an army fare that did not use tanks? While the answer to this is a function of threat and environment, modern war games show that a force in which tanks are either not present, or present in insufficient numbers, simply cannot fight successfully against an enemy equipped with even a modest number of tanks. Light infantry units equipped with the latest ATGM's are only marginally effective against armor. It is necessary to balance the combined arms team in order to have sufficient staying power, and enough mobile integrated firepower to wrest the initiative from the enemy. In summary, we don't fare well without tanks in the combined arms team. Tanks are necessary.

SURVIVABILITY

Can the tank survive? Again, this depends on threat and area; but what concerns us all is the allegation that modern ATGM's have driven the tank from the battlefield. There is no question that when tanks are employed alone against a combined arms force in terrain such as that in Europe, or the Mideast, their survivability is greatly reduced.

In the early stages of the October War, when the Egyptians crossed the Suez, and the Israeli Defense Force (IDF) was trying to contain the crossing, a pure force of 50 IDF tanks lost 40 in a local counterattack against an Egyptian defense based on dug-in *Sagger's* and *RPG-7's*.

When the IDF crossed the Suez, and attacked the well prepared defense, it was with a combined arms force, using time proven combined arms tactics.

In the breakthrough, the IDF lost 25 percent of its attacking tanks, destroying 30 percent of the defending Egyptian tanks. When the cross-Suez battlefield became fluid, the IDF, without ATGM's, destroyed 90 percent of the defending Egyptian tanks with no IDF losses, sweeping up the canal banks, destroying Egyptian ATGM positions where crews had been destroyed or driven from their positions by suppressive fires of artillery or by infantry.

How well can an individual tank survive a hit from another tank, compared to a hit by an ATGM?

We know that overall, our tanks have a higher probability of surviving a hit from a Soviet *Sagger* than from a kinetic energy round fired from a *T-62*

But the fact remains that the most lethal antitank weapon on the battlefield is the high-velocity tank cannon, and within range, tanks defeat tanks much better than do ATGM's.

How well can an ATGM survive on the modern battlefield?

Studies tell us that a division subjected to a 45-minute artillery preparation can expect to lose 25 percent of its ATGM teams. The tank's armor protection makes it relatively invulnerable to artillery fire.

How effective are ATGM's?

Although antitank guided missiles are generally considered to have high hit probabilities at ranges from 500 to 3,000 meters, experience in the October War does not reflect a high hit probability. It is estimated that several thousand

missiles were fired at IDF tanks, yet *at most* only a modest number of tanks destroyed were victims of missile hits.

It is often said that antitank guided missile systems are much cheaper than tanks.

On the surface, tanks are much more expensive. For example, suppose a tank costs \$400,000, its kinetic energy (KE) round costs about \$150, and the tank can fire about 400-500 rounds before the gun tube needs replacing. This gives a very rough cost of about \$470,000 for the tank, or about \$1,000 per KE round.

But suppose an ATGM costs \$3,500. The hardware cost of 400-500 missiles, including one launcher system mounted on a vehicle would be about \$2 million or \$4,000 per missile. Thus we could fire almost four KE rounds at a target for less than the cost of one guided missile. Therefore, the cost of the several thousand antitank missiles fired in the October War could have bought 40 to 60 tanks, a force which could be used on a variety of missions rather than a special antitank mission.

Furthermore, the additional tanks could fire enough kinetic energy rounds to have a high probability of hitting more than 5,000 enemy targets.

Properly employed, the tank not only can survive on the battlefield, it will dominate the battle. Without tanks, we don't accomplish much against an armor threat. The tank can survive better than an antitank missile system. Tanks are a relatively less costly way of destroying the enemy than are antitank guided missiles. As a bonus, because of their relative invulnerability to small arms and artillery, there will be fewer personnel casualties among tank soldiers than among antitank guided missile crews.

SECRET OF WINNING

It is the nature of our democracy and its armed forces that U.S. Army units deployed or sent overseas at the beginning of a war can expect to find themselves outnumbered. For a number of reasons, it should be expected that future wars will be shorter and more violent than in the past, and their successful outcome will depend considerably on results of those first violent battles. Winning the first battle(s) is critical, and they will have to be won by U.S. Army forces fighting outnumbered.

Now, critics of the tank say that in modern armor battle, our probable adversaries outnumber us so grossly that we can't hope to match their numbers. While this is true, we believe it should be regarded as an advantage rather than an encumbrance. This is so because tactical systems of our major potential adversaries have as a basic premise that the side with the biggest numbers must inevitably win. To support this view, they quote work of the distinguished British mathematician, F. W. Lanchester, whose early work in aircraft combat exchange ratios still provides the mathematical bias for many weapons systems exchange models — tank as well as aircraft. Unfortunately, more recently developed mathematical descriptions of combat exchange ratios arrive at a Lanchester-like outcome, even though by a different process. All these models predict, by whatever method, that the side that enters the fight outnumbered is foredoomed to defeat. While all this is academically interesting, and perhaps even logical, careful analysis of several hundred tank battles tells us that their outcomes defy predictions of any existing mathematical methods of combat.

In fact, it appears that the side which is outnumbered wins more frequently than not, and that probability of victory seems to hinge more on which side manages to use its mobility to best advantage to seize the initiative.

Therefore, we believe it most fortuitous that our potential adversaries have concluded that the ultimate truth is in Lanchester. For as in a thousand other battles, the IDF in the October War demonstrated again the bankruptcy of that idea.

The secret to winning is not in numbers. Mobility provides the means to mass in time and place arriving at a reasonably matched force ratio, say three, four, or six to one. Then by intelligent use of terrain and mobility maximizing one's own capabilities while at the same time minimizing one's own vulnerability, exchange ratios of six to one or better can be achieved, and indeed should be expected. Six to one exchange ratios demolish the neatness of Lanchester's squares, and are indeed quite in line with what really happens when masses of armored vehicles lock in mortal combat in situations in which the stakes are high.

And so tanks are essential, essential to the combined arms team, whose task it is to win the first battle(s) of the next war — win outnumbered, win by extracting from the enemy's overwhelming hordes exchange ratios of five or ten to one. It will not be easy. It can be done. It requires a certain cleverness, obstinacy, persistence; even more, it demands a thorough understanding of the dynamics of modern battle.

IMPROVED FIGHTING ABILITY

It is becoming increasingly apparent that we could be much more productive were we to concentrate on how to improve the fighting ability of our mobile combined arms team, instead of spending the inordinate amount of time now dedicated to proving to antimilitary skeptics that we need tanks at all. Proceeding along this line of reasoning, *what needs to be said?*

Traditionally, we have begun speculations about what to do next with any armament system with an analysis of what systems our potential adversary will have in the field. This global mindreading is called "threat analysis." It tries to read the minds of a group of men who probably haven't made up their minds yet. And so the further away from today one goes, the less useful this process becomes.

What is most instructive is to begin a "whither tanks" study with a technical analysis — a systematic evaluation of state-of-the-art developments in a number of technologies. What is the purpose of this study? It is to sum up where we are, and where we might most profitably go by pursuing one or more technical approaches.

Let me be specific. In the field of gun-ammunition, it now appears that we have the technical capability to produce armor that can defeat chemical energy rounds which depend on the shaped charge for penetration, in diameters that can reasonably be used on a mobile weapons platform. True, with a 10- to 12-inch diameter cone, even advanced armor might be penetrated. But even the most voluble tank enthusiast would probably be reluctant to suggest a gun that large. So what this tells us is that our technical problem is now to optimize kinetic energy systems that can defeat modern armor. For if we have the armor technology, we must assume our major adversaries have it.

We also know that a kinetic energy system can be optimized using advanced penetrator design and materials technology, and that it can be done in calibers smaller than those now considered necessary.

Propellant technology analysis suggests that we can exceed burning rate limits imposed by today's powders, and by so doing increase penetrator velocities, and thereby penetration ability.

Therefore, technology analysis tells us it is both necessary and possible to

build smaller, lighter, gun-mount combinations with much improved lethality.

A look at fire control technology suggests that we can provide our smaller, more lethal gun-mount combination with vastly improved fire control capabilities, rounding out the range-lethality equation. If we can increase the hit performance of tank cannon in the 1,500- to 4,000-meter range band, then the utility of ATGM systems will have been considerably degraded, and the old "rock, scissors, and paper" game has to be played again — with new rules.

Further, if we can mount such a system as I have just described on a more agile platform, the system itself could be more survivable, and therefore more lethal.

Again, technical analysis tells us that we have probably exhausted torsion spring technology, and that if we are to dramatically improve the way a vehicle meets the ground, some other technology has to be explored. We also know that technically, hydropneumatics, especially hydropneumatic energy storage systems, may offer a new agility dimension — hyperagility. For years we have insisted on higher horsepower-to-ton ratios as a means to greater agility. However, in World War I, my father's tank outfit marched to battle at speeds about the same as today's tank battalions, despite tenfold increases in horsepower per ton.

So we have to start asking the right questions — questions about agility and how it relates to survivability. Thus we must explore battlefield intervisibility segments — lengths, discontinuities, silhouette heights, acceleration rates in the low speed band, and other agility related parameters, in the end describing survivability in terms of ability to escape enemy fire control systems. Once this is done we can perhaps marry up our new, more lethal gun-mount system with a more agile, survivable platform — a tank for the year 2000.

While we are doing all this, we can reasonably expect others to be doing the same thing. So by the year 2000 we can expect to find ourselves, as we are today, with competing hardware systems which, despite some differences in sophistication, are relatively equal in battle.

Meanwhile, we can expect that for every *tankbangerboomer* someone develops, there will soon appear an *antitankbangerboomer*, and so "rock, scissors, and paper" is a game destined to continue. And about this phenomenon we must make one final observation.

The clear lesson of war is that in the end, the outcome of battle depends on the excellence of training, the quality of leadership, and the courage of soldiers. It is also quite clear that the side that thinks it will win, usually does.

Conversely, the side that thinks it may lose, or whose soldiers are not convinced that they can and will win, regardless of the odds, usually loses. We simply cannot permit ourselves to be seized with the defeatist malaise which underlies the antimilitarist dialogues now in vogue in our country.

For the U.S. Army must confront its foes in the first battles of the next war with soldiers whose state of training, whose confidence in themselves, and their leadership, whose confidence in the excellence of their equipment and tactics, and whose understanding of the dynamics of modern battle are such that they can fight successfully at odds of ten to one or more and win. Win through excellence in training, tactics, and weapons employment. Win because they are better led, and because they are convinced they can win the first battles, win outnumbered, win using the combined arms team built around tanks.



FORGING THE THUNDERBOLT

ARMOR SCHOOL TRAINING LITERATURE PROGRAM

In January 1975, the Armor School embarked on a new, intensively managed, 18-month training literature program, as did all other branch schools. This program is the first step in a TRADOC five-year plan to reduce the quantity and improve the quality of training literature.

The program is designed to provide literature that is radically different from current Army literature. The new material will be vibrant and challenging, and it will be readable by the intended audience. Manuals are to be vividly and simply written, using illustrations wherever suitable in order to grip and hold the reader's interest and reduce verbiage. All literature is developed to support two fundamental training documents: The Army Training and Evaluation Program (ARTEP) for each battalion and squadron, and the Soldier's Manual for each Military Occupational Specialty, e.g. FM-17-11D and FM 17-11E. These documents will enable the commander to better prepare the unit and individual soldier to fight the first battle of the next war outnumbered and win.

The scope of the new literature program focuses on two major areas: first, the two basic documents already mentioned which tell the unit and individual soldier every task that each must be able to do and how well to do it; and second, literature in support of the ARTEP and Soldier's Manual, such as field manuals, technical manuals, and training circulars, which tell the unit and individual soldier how and why to perform each task.

Emphasis is on performance-oriented training—the preparation for job performance through the mastery of clearly stated training objectives. Incorporated throughout the new training literature is a reanalysis of the nature of future war—its dynamics and lethality—and of new tactics and techniques that can be employed to enhance Armor's capability to fight and win while outnumbered. Included are offensive techniques of movement, defensive concepts, gunnery techniques, and training methods and devices. Each of the new concepts stresses the importance of terrain and the enemy, and their effect on the tactics we use.

The Armor School program covers the following seven significant categories of literature:

1. Army training and evaluation programs (ARTEP).
2. Soldier's manuals (FM's).
3. "How to Fight" manuals (FM's).
4. "How to Train and Maintain" handbooks (TC's).
5. Interim literature (TC's).
6. Technical manuals (TM's).
7. Other functional literature on items of equipment, etc. (TC's, DA PAM's, and FM's).

A vivid style that tells how to fight is a keystone of the new training literature. Also paramount are prompt training literature production, distribution, and field evaluation. Without the active participation by field units during the development of the training literature, the end product will be sterile.

During the production cycle, draft training circulars on doctrinal subjects are sometimes printed locally and distributed by USAARMS directly to unit commanders for comment and suggestions. More commonly, circulars will be printed by DA and distributed through the pinpoint system as an interim measure to get urgent doctrinal information to the field prior to the incorporation of that information into FM's. Also, all draft field manuals are staffed with appropriate field units, service schools, and other agencies. Regardless of the route of production, prompt field comments are essential so that the writers can react to the expressed needs of the troops. Until the Armor School began soliciting response by letter, it was difficult to know what the field wanted. Because of severe limitations placed on travel, the only way to maintain a continuing dialogue with the field is by circulating training literature and evoking response.

Distribution is a complex problem. Until a better system can be devised, the current pinpoint distribution system can be made to work if every effort is made to establish and maintain current pinpoint "accounts." To further assist, the Armor School has taken the following steps:

1. Published the "Hot Loop" in *ARMOR* Magazine,

offering bimonthly updates on the status of new literature.

2. Caused the Army-wide Training Support Department of the Armor School to publish and distribute yearly a catalog of training reference material, which includes charts recommending the number and type of all training literature for companies and troops.

3. Established a branch in the Directorate of Training, the Training Literature Branch (ATSB-DT-DD-TL), which not only supports the production of literature, but assists and advises units in the field on all training literature matters.

All units are asked to respond to new literature as it is published. Let the School know your ideas on gunnery, maintenance, tactics, etc.

Recently, rough drafts of TC 17-45-1, *The Air Cavalry Combat Brigade* and TC 17-17, *Gunnery Training for Attack Helicopters*, were mailed to selected units. Comments are urgently needed on the first since it will soon be converted to FM 17-45, *The Air Cavalry Combat Brigade*, in the "How to Fight" series. The latter will be published soon and will be distributed through the pinpoint system, so comments are needed on it also. There is also another aviation-oriented training circular soon to be distributed—TC 17-50-1, *Attack Helicopter Operations*. After staffing for field comments, it will become an FM. These circulars are not yet approved doctrine, but express the current thinking of the Armor School.

In the field of tank gunnery, three training circulars are on the way: TC 17-12-2, *Training Tank and Sheridan Crews to Shoot*, which has been printed by DA and is in the pinpoint distribution system; TC 17-12-3, *Battlefield Gunnery Techniques*, which was distributed in draft to the field last fall, is being printed now, and TC 17-12-5, *Tank Gunnery Training*, which was also forwarded in draft to the field for comment. The favorable comments from the field have been extremely helpful in its revision. The circular should be in pinpoint distribution with a new camouflage cover by late summer. Continuous comments are needed on all of these TC's, since they will serve as a basis for the new FM 17-12, *Tank Gunnery*, which is now under development.

"How to Fight" tactical training circulars are also making their way into the pinpoint distribution system. TC 71-4-2 *The Tank/Mechanized Infantry Team* should have been received by everyone in the field by now. TC 17-36-2, *The Armored Cavalry Platoon Organization and Techniques of Movement*, and TC 17-15-3, *The Tank Platoon Organization for Combat and Techniques of Movement*, were originally sent to the

field as black and white drafts. Each has been revised and recently printed in color — they should be received through the pinpoint system soon.

The aforementioned training circulars have required a major effort by the Armor School; they are nearing completion and will readily serve as interim manuals. Already, emphasis has been turned to completing armor ARTEP's, soldiers' manuals, platoon handbooks, and "How to Fight" literature. The status of these manuals is:

1. ARTEP 17-35, *The Tank Battalion and Combined Arms Task Force*, completed final field validation in June. It should be printed by Department of the Army by late this year.

2. ARTEP 17-55, *The Armored Cavalry Squadron*, is well under way. The preface, chapters one and two, and annexes A and B, along with the Level-3 training and evaluation outlines, have been mailed to the field for review and evaluation. Levels 1 and 2 are to be incorporated by fall.

3. ARTEP 17-65, *The Air Cavalry Squadron*, is to be completed and printed in draft for field review and evaluation by late fall.

4. ARTEP 17-385, *The Attack Helicopter Battalion*, is to be completed and printed in draft for field review and evaluation by late fall.

5. FM 17-11E, *Soldier's Manual*, for armor crewmen, is scheduled for completion and printing late this year.

6. FM 17-11D, *Soldier's Manual*, for reconnaissance specialists is scheduled for completion and printing late this year.

7. FM 9-45N, FM 9-45P and FM 9-45R, *Soldier's Manual*, for organizational tank turret mechanics on the medium tank, the M-551 and M-60A2 respectively are scheduled for completion and printing late this year.

8. FM 71-1, *The Tank/Mechanized Infantry Company-Team*, has been completed in first draft and forwarded to TRADOC for review.

9. FM 71-2, *The Tank/Mechanized Infantry Battalion-Task Force*, is scheduled for draft and field review in the fall.

10. FM 71-3, *The Armored and Mechanized Infantry Brigade*, is scheduled for draft and field review late this year.

11. FM 17-12, *Tank Gunnery*, is scheduled for draft and field review this fall.

12. FM 17-45, *The Air Cavalry Combat Brigade*, if not already received by field units, is on its way for field review.

13. FM 17-50, *Attack Helicopter Operations*, is also on its way in draft for field review.

14. FM 17-95, *Cavalry Operations*, should be on its way in draft for field review.

15. FM 90-3, *Desert Operations*, should be received during the third quarter of FY 76 for field review.

16. TC 17-2, *Tank Platoon Handbook (M-60A1/A3)*, tells the small unit leaders and soldiers "how to train and maintain." This handbook will serve as a model for six other unit- and equipment-oriented handbooks. It is scheduled for field review this winter.

UPGRADING TACTICAL INSTRUCTION

Ever-improving technology in the areas of target acquisition, mobility, and weaponry has compelled the Army to reevaluate tactics and develop new doctrine based upon the enemy threat and the realization that in the next war we will have to fight outnumbered and win.

In addition to being exposed to the familiar concepts of suppression, overwatch, and the combined arms team, Armor Officers Advanced Course (AOAC) students in September can expect to be among the first to be provided with the revised doctrine currently being developed by the "How-To-Fight" Task Force that is operating within the Command and Staff Department, U.S. Army Armor School.

A variety of new concepts in offense and defense will be presented, including new movement and helicopter employment techniques, as well as the introduction of ambush tactics to defensive operations.

Improved methods of instruction will also enable the student to better understand the material presented. A Huntley-Brinkley approach to platform instruction will provide diversity, as well as improve student-instructor interaction. While historical examples, television tapes, films, and practical exercises will continue to supplement classes, reaction tapes to test individual response and computer assisted instruction will add another dimension. Information introduced into the computer during practical exercises will immediately be evaluated and will provide prompt indications of student tactical successes and failures.

Additionally, facilities available to instructors and students are being improved. The Department has obtained approval from the Assistant Commandant to proceed with a model classroom which will be equipped with a rear-view projection system. This classroom will also have the capability of being divided into four smaller soundproof sections for the conduct of small-group instruction. In each section, the instructor will be provided with a movable instructor's stand which will contain a television set, overhead and 35-mm projectors, and a tape recorder. This will allow the in-

structor complete flexibility in conducting small-group instruction with equipment that was previously available only for instructing large groups of students. The anticipated date for completion of the model classroom is in the early fall of 1975.

Through these innovations and instructional techniques the Command and Staff Department is striving to provide the best instruction in the latest concepts to combat arms officers so that U.S. ground forces can fight on the modern armor battlefield against numerically superior forces and win.

FIELD ARTILLERY SUPPORT

There is a new flavor to fire support instruction taught in the Command and Staff Department as a part of combined arms training. All professional development courses are now receiving instruction on dedicated field artillery support for the tank/mechanized infantry team in a movement to contact. In support of movement to contact, one or two firing batteries from the direct support field artillery battalion may be dedicated to leading company/teams on a one-to-one basis for limited periods. The brigade commander will determine which of his elements may require this dedicated support and will coordinate his requirements with the direct support field artillery battalion commander.

A dedicated battery will have an exclusive fire mission channel from the forward observer with the company/team. This battery will monitor the supported maneuver unit's command net so that it can follow the supported force's progress and anticipate their needs. Some weapons will be laid on priority targets, ammunition ready, prepared to respond immediately to requests for fire.

Other techniques being adopted by the Field Artillery to improve their responsiveness to maneuver companies moving to contact are to shorten calls for fire, simplify fire planning techniques and abbreviate fire direction procedures.

In summary, the new procedures being adopted by field artillery units will provide for *immediate* delivery of suppressive fires in support of the tank/mechanized infantry team, when the commander needs the support and before the target dissipates.

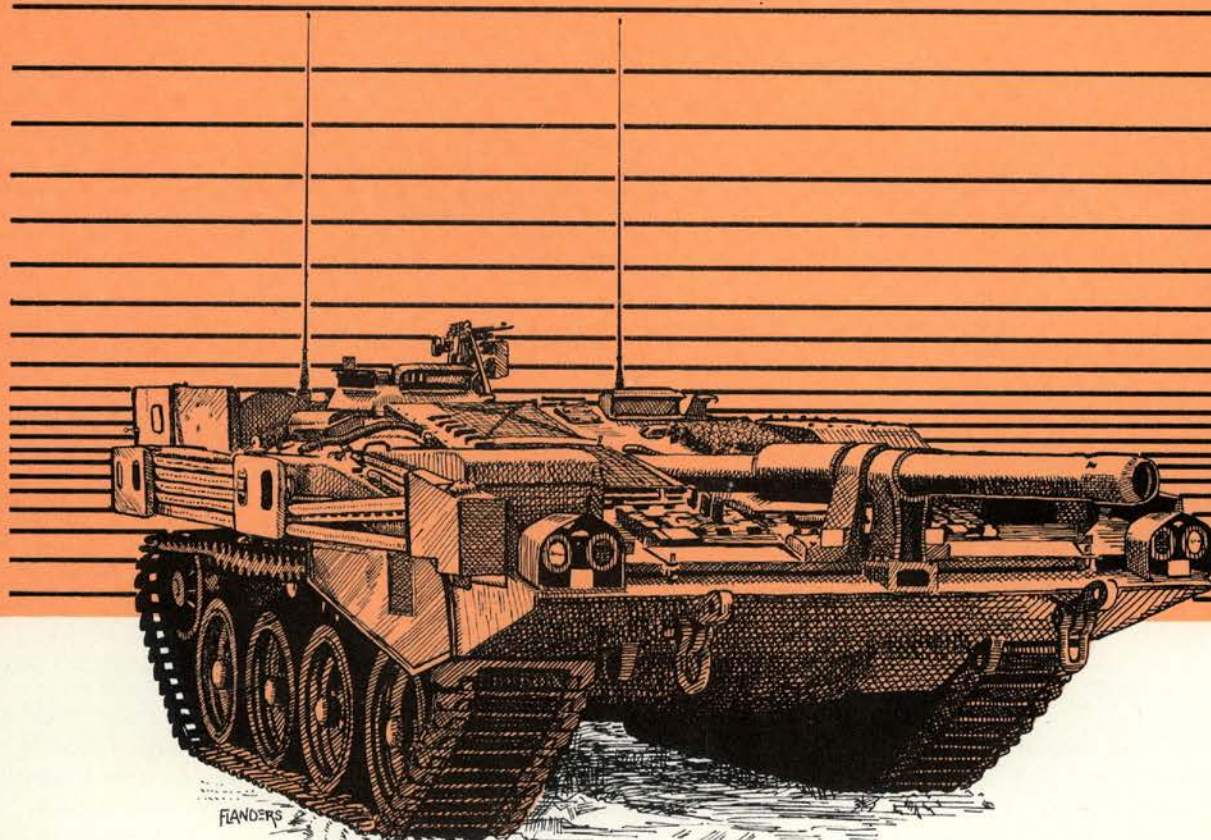
ARMOR OFFICER BASIC COURSE (AOB)

In response to requests from field commanders, officers attending the basic course will now receive 13 hours in maintenance management and related subjects.

An *M-60A2* training course of 32 hours has been made available as an add-on to AOB for those officers being assigned to *M-60A2* units. □

TURRETLESS TANKS?

by Richard M. Ogorkiewicz



Whenver the current generation of tanks is compared with its predecessors, it is evident that great progress has been made in such areas as gunpower and fire control systems. It is equally clear, however, that in some respects there has been little change since the end of World War II. In particular, the configuration of tanks remains much the same as it was 30 years ago, or even earlier.

Several departures from the accepted practice have been considered over the years, but in the end, all but one have been rejected. For instance, in the late forties and early fifties, trunion-mounted, or oscillating, turrets were seriously considered as an alternative to conventional tur-

rets. Although a turret of this type was adopted for the French *AMX-13* light tank, its installation on other tanks did not proceed beyond a number of experimental models, such as the French *AMX-50* battle tank and the U.S. *T-69* medium tank.

Similarly, low-silhouette cleft turrets got no further than the U.S. *T-92* light tank, while the concentration of the entire tank crew in the turret has not advanced beyond the prototypes of the ill-starred *MBT-70/XM803*.

The one exception to the rule is the Swedish turretless *S-Tank*, or *Strv 103*, to give it its Swedish Army designation. The *S-Tank* was adopted by the Swedish Army in

the mid-sixties in preference to turreted tanks, and its characteristics have drawn increasing attention to turretless configurations as an alternative to conventional design for future tanks.

Limited-traverse Vehicles

In principle, there is nothing new about turretless tanks. In fact, the very first tanks, built in Britain and France in 1916, were turretless and many more turretless vehicles have been built since then. Admittedly, most of those built since 1940 have been called assault guns or tank hunters rather than tanks, but they have had much the same characteristics as tanks, and have often been used as such. For instance, during the latter part of World War II, one of the three companies of some German panzer battalions was equipped with turretless assault guns, while the other two had turreted tanks. In the Soviet Army, the integration of the two types was at one stage carried even further. Thus, some Soviet tank brigades had turreted *T-34*'s mixed with turretless *SU-85*'s right down to platoon level.

However, although they were very effective at times, the turretless vehicles of World War II offered few advantages over turreted tanks. In fact, they were superior on only two major counts. One was their ability to accept larger guns more easily than corresponding turreted vehicles. Their other, and more permanent, advantage was a lower silhouette.

Otherwise, the turretless vehicles of World War II were not significantly better than turreted tanks, and this is equally true of their only two descendants, the *Jagdpanzer (Kanone)*, currently used by the Bundeswehr and the Soviet *ASU-85*. In particular, they are basically no different to operate. They require, therefore, as large a crew to man them as turreted tanks and their internal volume is no smaller, which means that they are not much lighter for a given thickness of armor. In fact, they do not differ in principle from conventional, turreted tanks except for the limited traverse of their main armament.

S-Tank

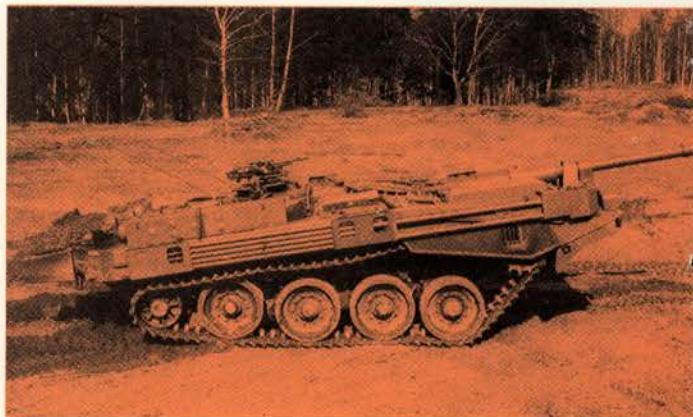
In contrast, the *S-Tank* differs in several respects from turreted tanks and it differs also from the earlier turretless vehicles characterized by the limited traverse of their main armament.

The present writer has already described the *S-Tank* in *ARMOR*, first in the November-December 1964 issue, after examining its preproduction models, and then in the March-April 1968 issue, after the appearance of the first production vehicles. Moreover, the originator of the *S-Tank*, Sven Berge, has himself discussed the power plant and other features of the vehicle in the March-April 1973 issue of *ARMOR*. Nevertheless, it might be worth recalling that the *S-Tank* is a turretless vehicle with the mounting of its 105-mm gun fixed in the hull. In consequence, its gun is elevated or depressed by altering the pitch of the hull by means of an adjustable hydropneumatic suspension and traversed by turning the whole vehicle by means of a two-stage steering system, which incorporates a hydrostatic drive for fine steering movements and a clutch-and-brake mechanism for rapid turns.

An immediate advantage of fixing the gun mounting in the *S-Tank* is the elimination of the space which would otherwise be required within its armor envelope for movement of the breech end of the gun. A further consequence of the elimination of the angular movement of the gun is that it made it possible to provide the *S-Tank* with a relatively simple and robust automatic loader. This, in turn, eliminated the need for a human loader, which reduced the space required within the tank to accommodate the crew.

Another important consequence of the adoption of a fixed-gun mounting, and therefore of the control of the gun by movement of the hull, is that it made it possible to provide the *S-Tank* with integrated gun and driving controls. These, together with the automatic loader, have made the *S-Tank* so simple to operate that in an emergency, it can be fought by one man—which is not possible with any other tank. Under normal conditions, the integrated controls, which are duplicated, enable the workload to be shared between the commander and the driver/gunner, thereby reducing crew fatigue.

The *S-Tank* also carries a third crewman, a three-man crew having been considered necessary not so much for fighting tanks individually as for those tanks which are



used by platoon and company commanders. The third crewman sits behind the driver/gunner, facing to the rear, and not only operates the radios and ensures all-round observation, but is provided with another set of driving controls. As a result, the *S-Tank* can be driven in reverse as easily as forward, and in retrograde movements, it can move away from the enemy, not only keeping its gun pointed in his direction, but also presenting to him its best armor. This has not been achieved so far with any other tank except the *MBT-70/XM803*, where the driver sat in a counter rotating capsule.

Fire and Movement

Of all the advantages which accrue from the adoption of a turretless layout combined with a fixed-gun mounting, the most important is the reduction in the internal volume of the tank. Because of this, a turretless fixed gun tank can be made lighter than a turreted tank, or a turretless vehicle with limited gun traverse, for the same degree of armor protection. Or, what amounts to much the same thing, it can be better armored than other vehicles of the same weight.

The second important advantage of a fixed-gun vehicle, which has been demonstrated by the *S-Tank*, is that it is much simpler to operate than other tanks. In particular, its operation does not require the coordinated action of several crew members, which is necessary in a conventional tank. Thus, when the tank commander wants to engage a target quickly, he can do so directly, instead of having to issue orders and have the driver, gunner, and loader act on them, which inevitably takes time. In fact, the commander can run the tank like a racing car, instead of having to command it like a battleship.

The principal criticism levelled at the *S-Tank* is that it cannot fire on the move, unless the target happens to be straight ahead of it. This disadvantage is inherent to fixed-gun tanks, but the critics of the *S-Tank* tend to exaggerate it.

First, no tank can fire as accurately on the move as it can at the halt, which means that turreted, as well as fixed-gun tanks, have to stop to engage a target with a high probability of success. Secondly, the *S-Tank* commander's cupola and sight are stabilized, so that he can acquire targets on the move no less than the commanders of turreted tanks. Thirdly, the *S-Tank* can engage secondary targets on the move with the machinegun mounted on the commander's cupola. Fourthly, the stop-go tactics which the *S-Tank* has to adopt under fire may be a better proposition than uninterrupted movement and engaging the enemy on the move, not only because of the higher probability of hitting him, but also because of the lower probability of being hit due to intermittent movement.

Moreover, what matters in the end is not whether a tank can or cannot fire on the move, but whether it can satisfy the more general, tactical requirement for fire and movement and whether in so doing it, can engage targets at least as quickly, overall, as other tanks. This the *S-Tank* certainly can do in most circumstances. Under a few conditions, as for instance when the ground is slippery or extremely uneven, it may be at a disadvantage, but against this must be set all its advantages over turreted tanks.

Since the *S-Tank* was first built by the Bofors Company in 1961, the concept of the fixed-gun tank has certainly proved viable. This has emerged not only out of the extensive trials and the subsequent adoption of the *S-Tank* by the Swedish Army, but also out of the trials carried out by the British Army, which borrowed two *S-Tanks* from Sweden in 1968 and 10 others, for more extensive tactical trials, in 1973.

Possible Developments

Successful as it is, the *S-Tank* does not represent the only possible embodiment of the fixed-gun concept. This concept is, in fact, capable of considerable further development.

The *S-Tank* itself can be improved further by being retrofitted with even more effective, composite armor which can be installed on it much more easily than on other tanks. In the writer's opinion, this type of vehicle would also be considerably improved by relocating the third crewman behind the commander and making him operate a cupola-mounted machinegun, which the commander has to do in the *S-Tank*. At the same time, the

driver should be provided with a seat which could be turned around so that he could face rearward and use the rear set of driving controls for prolonged movement in reverse.

One of several other development possibilities which are open is a transformation of the fixed-gun tank into a semi-fixed-gun tank. In such a vehicle, the gun would still be traversed by turning the whole vehicle, but elevated or depressed independently of the hull. This would greatly simplify the suspension but still make it possible to retain a relatively simple automatic loader.

The automatic loader of the *S-Tank* already gives a considerably higher rate of fire than that possible with manually loaded guns and makes all 50 of its rounds ready to fire. The location of the ammunition magazine at the rear of the hull also makes it much easier and quicker to reload than the stowage racks of conventional tanks. Moreover, the magazine forms a separate compartment and it could be isolated still further from the crew and the rest of the vehicle. This would make fixed- or semi-fixed-gun tanks much less vulnerable to an explosion of its own ammunition, which was responsible for the destruction of so many tanks in the October War.

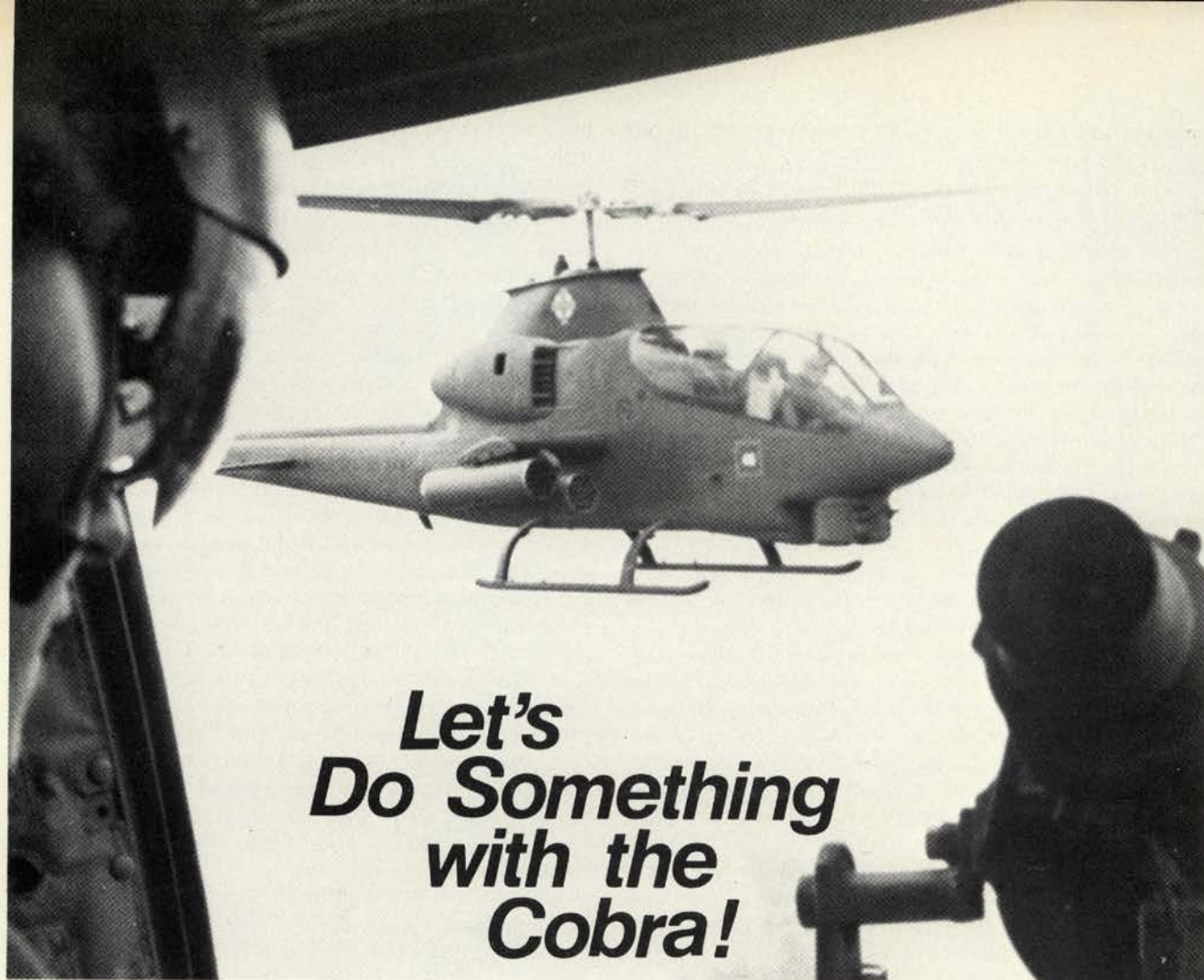
A fixed- or semi-fixed-gun tank with an automatic loader could also have its gun externally mounted, which would make it even better able to use ground cover: its low silhouette already gives it a better chance of finding hull-down firing positions and an externally mounted gun would enable it to fire from behind cover without exposing more than the gun and the heads of periscopes.

Another obvious possibility is a simplification of the engine installation. On the *S-Tank*, it consists of a diesel in combination with a gas turbine, which is advantageous from some points of view. However, reverting to a single, diesel engine would not only simplify the power pack, but would also help to reduce costs, which should be lower for a fixed-gun tank than a comparable turreted tank.

In the light of all these and other possibilities, the fixed-gun tank concept embodied in the *S-Tank* clearly deserves further study and development. Its full exploitation might require some changes in tactical thinking, but this should not prove an insurmountable obstacle since there is nothing sacrosanct about the present tactics developed with turreted tanks.



R. M. OGORKIEWICZ, widely recognized as a leading authority on armored fighting vehicles, is a consulting engineer and author of two books and more than 200 articles, including 62 in **ARMOR**, on various aspects of armor. He has also lectured extensively on the subject not only in the United States and England, but also in Sweden, Israel, Brazil, and South Africa.



Let's Do Something with the Cobra!

by Lieutenant Colonel David L. Funk

With all the talk about advanced attack helicopters (AAH's) and the *AH-1Q Cobra* armed with *TOW's*, many of us tend to forget that the "plain Jane" *AH-1G Cobra* is our bread-and-butter attack helicopter and will remain so for many years, even after its successors are on hand. Therefore, since the *Cobra* will be around in something like its present form for some time, it's up to us to examine just how to fit it into the midintensity battlefield.

The basic *Cobra* was designed and built to meet the requirements of the Vietnam conflict. Armament and armor were optimized to meet these requirements. Now, facing a far more advanced threat, both equipment and tactics require revision. During the April 1972 North Vietnamese army offensive and the October War, vivid examples of the threat were presented. Antiaircraft weapons systems such as the *ZSU-23* and *SA-7* SAM force the attack helicopter to alter its previously successful methods of operation in order to survive.

The Priority Aircraft Subsystem Suitability Intensive Review (PASS-IN-REVIEW) at Fort Rucker is addressing many of the deficiencies of the present *Cobras* (both *AH-1G* and *AH-1Q*). Plans are being developed to improve the performance and combat effectiveness of both helicopters. The purpose of this article is to set forth the views of one user and not to take issue with, or dispute, the results of the PASS-IN-REVIEW effort. Indeed, there appears to be a wide area of agreement within the user community on

what needs to be done, differing only in how and in what order of priority these actions should be accomplished.

My proposal is that a two-phase effort be initiated to improve the aircraft and to update tactical employment concepts.

Phase I would encompass those actions that must be accomplished immediately to make the present *Cobra* a viable killer in a midintensity combat environment. The Phase II effort would be of a longer range nature, requiring a step-by-step operation using the building block concept, and would take advantage of improved technology to bring the basic *Cobra* airframe up-to-date to provide an improved combat capability. Since these efforts will require the coordination of numerous organizations within the Training and Doctrine Command (TRADOC) and Army Materiel Command (AMC) communities, someone must assume overall direction of the program. The logical choice for provision of the leadership and direction of this program is the Armor Center. Due to the fact that most *Cobras* are employed by air cavalry and attack helicopter units, Armor has had proponentcy for them for some time. However, a great number of agencies have retained pieces of the attack helicopter development pie. Few would oppose Missile Command (MICOM) development of air-to-ground rockets or Electronics Command (ECOM) avionics development, but most would agree that someone must pull these efforts together and direct them toward a

common and attainable goal. This should be the ultimate user of the final product.

Once overall direction is established, the Phase I effort must immediately begin. The two major subdivisions of this

phase are hardware and tactics. These must be concurrent, with the tactical changes taking advantage of projected performance and capability increases gained by hardware modifications.

PHASE I

The Phase I hardware improvement should include, but not necessarily be limited to, the following items.

A drastic weight reduction program is required to improve performance because the present *AH-1G* is grossly underpowered. This weight reduction should be based on removal of all equipment that does not contribute to mission accomplishment in the midintensity, nap-of-the-earth (NOE) environment. Some candidates for possible elimination might be: the 40-mm grenade launcher, *XM-73* rocket sight, pilot and copilot's seat armor, and replacement of the *ARC-54* radio with the *ARC-114*.

The 40-mm grenade launcher would be of little or no value when flying NOE against the present threat due to its low muzzle velocity which imposes unsatisfactory time of flight and superelevation constraints on its employment. Elimination of this weapon, its ammunition, ammunition drum, and associated chuting, would reduce overall aircraft weight by 221 pounds. Elimination of the *XM-73* rocket sight accomplishes two things. First, it reduces aircraft weight by six pounds and second, elimination would significantly improve the pilot's forward visibility. However, a rocket sight is required for NOE firing; perhaps a very simple lightweight beam-splitter/pipper arrangement could be installed which would not impose a significant forward visibility or weight penalty.

Removal of the seat armor, which is placed primarily to protect the crew from small arms fire from below and from the rear, would save 200 pounds. At first glance, this might seem a rash move. However, when flying NOE against a threat in a midintensity environment, the survival benefit of this armor is negligible. More effective, better situated armor will be discussed later as a Phase II modification.

There are other ways to save weight in addition to the examples cited above. A thorough weight-reduction study should be made by the Armor Center, with participation by representatives of both using units and the development community, with the objectives of attaining immediate increased performance by lightening the aircraft.

Even though weight is a vital concern, there are several items that must be added to immediately improve survivability and mission performance. Due to the nature of the threat, we're going to have to spend some of our saved weight on two items which are required to prevent an early demise on the midintensity battlefield. The infrared (IR) suppression kit (40 lbs. or so) and a radar warning and homing receiver of the *APR-30/41* variety (7 lbs.), are immediately required to give our aviators a fighting chance against the *SA-7*, *ZSU-23*, and similar threats. In addition, some thought should be given to mounting a radar altimeter, which, when used in conjunction with the *PVNS-5* night vision goggles, gives us at least some night capability. Another lightweight, simple improvement

which must be made early-on is the addition of simple wirecutters to the forward cross tubes and forward of the sail and main rotor mast. Nothing complex is required, just something which will cut telephone cable and all but the largest electrical transmission lines. Cropdusters, operating in a similar environment, have been using used mower blades on their aircraft for years with notable success. The idea is to save lives and aircraft, especially in the wire-laced European area of operations. The final immediate materiel improvement required in Phase I is a complete stripping and repainting of all *Cobra* aircraft with a non-gloss, lusterless, olive drab paint which minimizes radar and IR reflectivity. This must include the rotor heads, blade tips, and all exposed nontransparent surfaces. Then, water-based paints should be developed so that various camouflage color schemes can be temporarily applied to make our killer blend into its surroundings.

TACTICS

Now that we've discussed the immediate materiel improvements, let's look at the tactics. I'm sure that every *Cobra* unit commander is burning the midnight oil working on this and I don't claim to be an expert, but it appears that there are several areas that merit investigation and a few points that many of us tend to forget.

First of all, at this point, we're working with the existing armament package, i.e., the *XM-28* (less 40-mm), *XM-18*, *XM-35*, and the 2.75-inch rockets. All have major limitations in the midintensity environment. The 7.62-mm minigun is limited in range, accuracy, and lethality; the 20-mm gun has the same basic limitations to a lesser degree, plus an additional disadvantage—it cannot be traversed independently of the aircraft. The 2.75-inch rockets are not particularly accurate when fired from NOE, but given a hit, they do have fair to good target effect, if the proper warhead is used.

Again we are faced with a situation in which a great number of people have a piece of the action. As previously mentioned, I'm sure that every unit commander is working out tactics for his particular organization and area of operation. In addition, the Armor School, Aviation School, MASSTER, Combat Development Experimentation Command (CDEC) and a number of other agencies have been working on bits and pieces of the problem. Once again I submit that the Armor Center should pull these efforts together. We must make an effort to preclude the situation that developed in Vietnam where each attack helicopter (gun) unit did their own thing. Little or no standardization of tactical training or employment was ever achieved. This limited tactical flexibility and generated a training load, at unit level, that is unacceptable in today's Army. (Let's face it, it's just not cost effective.)

I believe that as a point of departure, tactics must start with the transition training of the pilots. This is as good a place as any to start emphasizing the basics of midintensity combat, primarily at NOE. All *AH-1* gunnery, navigation, and flight training should be done in this environment. Use of terrain and selection of firing positions should be stressed and carried forward into team training in conjunction with scouts and other attack helicopters.

Tactical training must reemphasize that attack helicopters fight as part of a combined arms team, one-on-one engagements must be deemphasized. The use of artillery to button-up the enemy, smoke and chaff to confuse him, and offensive action to kill him, must be stressed. Like the tanker, the attack aviator must not fight alone and must learn to use all the tools of the trade. The mobility of the helicopter must be used to advantage to deceive the enemy, while its built-in agility should be exploited in evasive maneuvers designed (and tested) to increase survival.

Perhaps the greatest benefit of the attack helicopter's mobility is the shock that can be achieved by striking at an unexpected point, then getting out fast, and striking again at another target before the enemy can react. This must be exploited and emphasized in training exercises, not only for the benefit of the attack aviators, but to insure that this capability is recognized and understood by those who have operational control of attack helicopter organizations.

We've briefly touched on the weapons available to the attack helicopter (*AH-1G*) but the real problem is: *How do we use them at NOE?* I think there is general agreement that to survive, the attack birds must maintain maximum standoff from the threat. For the standard *Cobra*, this should be at least out of small arms range, and up to 3,000 meters, if possible. However, since targets must be engaged with the 20-mm cannon and 2.75-inch rockets, the *Cobra* must close to its effective range. I haven't forgotten the *XM-18's* and *28's*, but feel that, if employed, their primary utility is self-defense. We (the Armor community—with Armor Center leadership) need to do a great deal of homework on how to successfully employ the guns and rockets. Much has been done, but it has not been tied together and, in many cases, has not reached the ultimate user. Techniques of NOE gunnery such as running, low-level popup from behind masking terrain, firing from the ground, and indirect fire must be fully developed. Army Training programs (ATPs), Army Training Tests (ATT's) and Gunnery Qualification Tests (GQT's) must



Cobra employing NOE

be written, using the information obtained during the development of new gunnery techniques. While all this is being accomplished, we must spend some time and effort looking for satisfactory locations to conduct NOE training and gunnery in and over terrain approximating both Mid-east and European environments (at least for CONUS-based organizations). Most posts are just too small for adequate NOE flight training and competition for available ranges, along with safety constraints imposed by small impact areas, would preclude a realistic gunnery program. Perhaps several training areas at places like Stewart, Bliss, Yuma, and Yakima should be established to serve units on a geographical basis. Organizations could rotate through these training areas annually, much as 7th Army tank units rotate through Grafenwoehr.

In any event, some method must be found to upgrade our attack helicopter training, both in realism and quality, to at least the same high standards we require of our tank and ground cavalry organizations. While this is being done, additional investigations and testing should be carried out in other areas, such as employment of attack aircraft in poor weather, instrument meteorological conditions (IMC), at night, and under electronic countermeasure (ECM) conditions. The cost of our attack helicopter systems is too great to permit them to sit on the ground, contributing nothing, during periods of poor visibility or heavy ECM activity.

PHASE II

Since it is clearly apparent that we will not have the necessary funds to equip all attack and air cavalry units with the advanced attack helicopter, the Phase II *Cobra* will meet the need for a companion aircraft for the *AAH* by filling the low side of the high/low mix in the Army force structure in the 1980's. In addition, it will provide a solution to the problem of what to do with the *AH-1Q's* when the *TOW* is supplemented by future antitank subsystems. These airframes could be retrofitted to the Phase II

configuration, thereby extending their service life and tactical utility.

As previously stated, the Phase II effort will be a long-range program to update the present *Cobra* airframe. In this regard, the obvious starting point is the engine and power train. The uprated engine could be a vastly improved version of the *ICAM T53-L-703* or something in the *T55L7C* class, which should give the *Cobra* something approaching the 500 FPM rate of climb at 0 airspeed on a

4,000-foot density altitude, 95° day at 10,000 lbs. + gross weight. This, plus an upgraded transmission, tail rotor drive shafting, gearboxes, and main and tail rotor blades should give us the NOE performance required and additional gross weight capability to carry the weight of other required improvements. In constructing this "hot rod" *Cobra*, care must be taken to insure that the fuel consumption specifics are not drastically changed. Since we are not changing the basic airframe and the fuel tankage cannot be increased, we are, therefore, constrained by the present maximum fuel capacity to obtain the desired combat radius of action.

In making the required changes to larger chord main and tail rotors to absorb the additional horsepower produced by the larger engine, we should thoroughly investigate the use of fiberglass and various boron compound blades to decrease vulnerability to the 23-mm API and HEI rounds, lower radar reflectivity, and increase time between required blade change.

If this increased horsepower program is successful, it opens the door for additional improvements required to extend the standard *Cobra's* service life well into the 1980's.

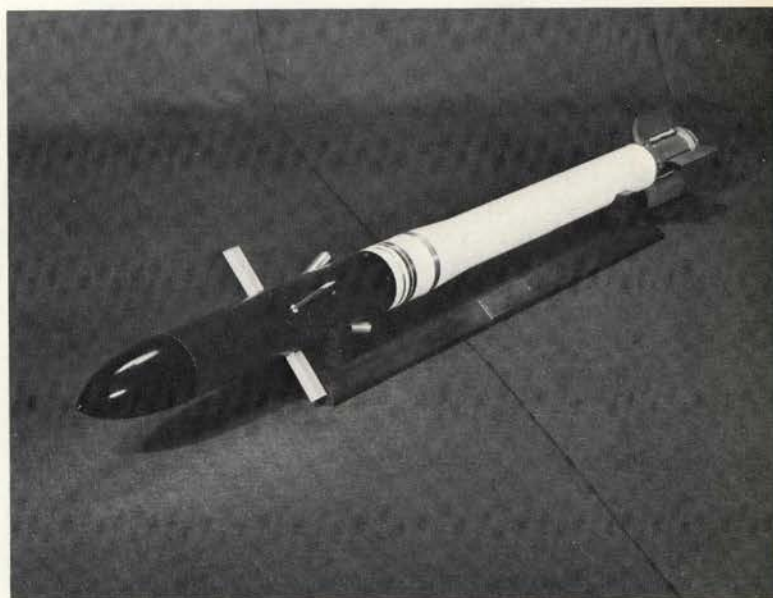
With the additional horsepower available, the *Cobra* should be a respectable NOE performer with some gross weight to spare, therefore, some much needed additions can be made to improve mission effectiveness and survivability. The primary remaining constraint, as was the case with the fuel capacity, is space within the airframe and external stores capacity. Therefore, where appropriate, special mission pods should be developed.

Since the attack helicopter's primary mission is, by definition, attacking the enemy; we must provide an improved attack capability. Both the turret weapons and external stores offer areas where improvement can be made. As previously discussed, the *XM-28* and *XM-35* systems don't do much for us in the midintensity environment. Both should be replaced by a 25- or 30-mm weapon, with a capability of defeating light armor out to 3,000 meters. This weapon should replace the *XM-28* turret and have similar traverse and depression capabilities plus the greater elevation required for the 3,000-meter range. When coupled with an improved, firmed-up, pantagraph with flip-flop optics, having at least 1X through 8X magnification; simple fire control and range estimation device; and an interconnection with the aircraft's SCAS system to eliminate the effects of recoil on the pitch, roll, and yaw axis, the 25- or 30-mm weapon should give us what we need. Ammunition should be dual purpose, similar to the Weapons Command (WECOM) 30-mm, but with

somewhat higher velocity to eliminate the need for complex fire control computers and to improve hit probabilities. Ammunition weight and size should be reduced so as to permit at least 500 rounds to be carried in the existing ammunition bay. If at all possible, both the gun and ammunition should be common with other ground and air applications, i.e., the advanced attack helicopter and the mechanized infantry combat vehicle. This is attractive from both the cost and logistical support standpoints.

Concurrent with the gun development, the external stores munitions must be updated drastically. The 2.75-inch Free-Flight Aerial Rocket (FFAR) appears to have limited growth potential due to the limitations of its warhead size and motor capability, which may not permit it to be developed into a viable NOE midintensity system. However, the 2.75-inch capability should be retained for future low intensity conflicts and for special purpose uses, such as battlefield illumination and submunition delivery.

A true fire-and-forget system based on the airframe and motor components of the Selected Effects Armament System (SEAS) appears to be a good place to start with something that would take us beyond *TOW* and *Hellfire*. This system should be developed for two primary purposes;



Northrop "Arrow" with laser beam riding antitank warhead. Several contractors are engaged in development efforts in high-velocity guided weapon technology.

first to kill tanks and other point targets at 4,000 meters and second, to kill air defense weapons at 4,000 to 5,000 meters. Developing a selection of warhead and guidance options, such as laser beam riding the 4.5-inch missile appears to be the way to go on this. The result should be a very high-velocity missile with excellent hit/kill probabilities, which can be fired from a hover, that does not require long exposure of the firing aircraft after launch for guidance or designation. This same high missile performance will eliminate the requirement for complex fire control subsystems due to its flat trajectory and associated small circle of error probability (CEP). Therefore, only a very simple heads-up sight should be required.



XM230 Hughes "Chaingun," a possible 25/30-mm cannon weapon for the Phase II *Cobra*.

The previously mentioned special mission pods should be developed to assist the crew in performance of missions beyond the capability of the present *Cobra*. The two primary reasons for their development as pods are the space restrictions of the *Cobra* airframe and the fact that they need not be carried or issued when not required. This keeps cost down and precludes maintenance of additional systems not required for normal missions. The basis for issue of podded systems would be prescribed by the theater commander.

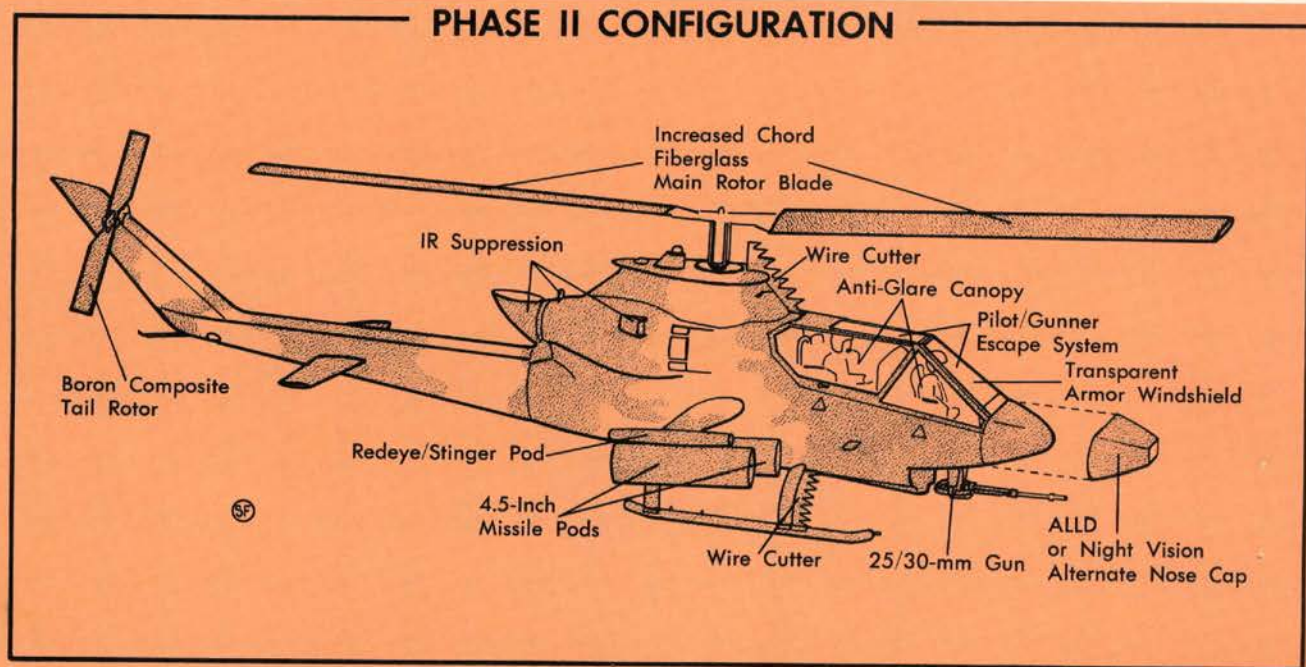
As with the weapons systems, these pods should be developed as standard items that, where required, could be utilized by all *Cobras* and *AAH's*.

The first of these podded systems, in priority, should be an active electronic countermeasure (ECM) pod which

restrictions, could not be permanently mounted in the airframe. Only a fraction of the fleet need be equipped with this expensive and heavy option. Due to the requirement for maximum field of view for the night vision optics, they must be mounted in the nose of the helicopter forward of station 46. This could be accomplished by deleting the forward battery mount, moving the Pitot tube to the transmission fairing and installing a removable nose cap. The removable nose cap would also facilitate use of this space for other future optional equipment.

Additionally, if a requirement for laser tracking and designation is established, the pod and nose-mounted tracker-designator is most certainly the way to go on this. Otherwise, some aircraft would be permanently equipped with an expensive special mission package of limited utility

PHASE II CONFIGURATION



would function as a penetration aid, allowing the aircraft to function in an active electronic warfare (EW) environment. This should be a very lightweight unit, with small cross section, designed to be mounted on the tip of the stub wing, to preclude displacement of ordnance. The programming should be updated constantly to counter the threat in the area of operation(s) envisioned for the employing organization.

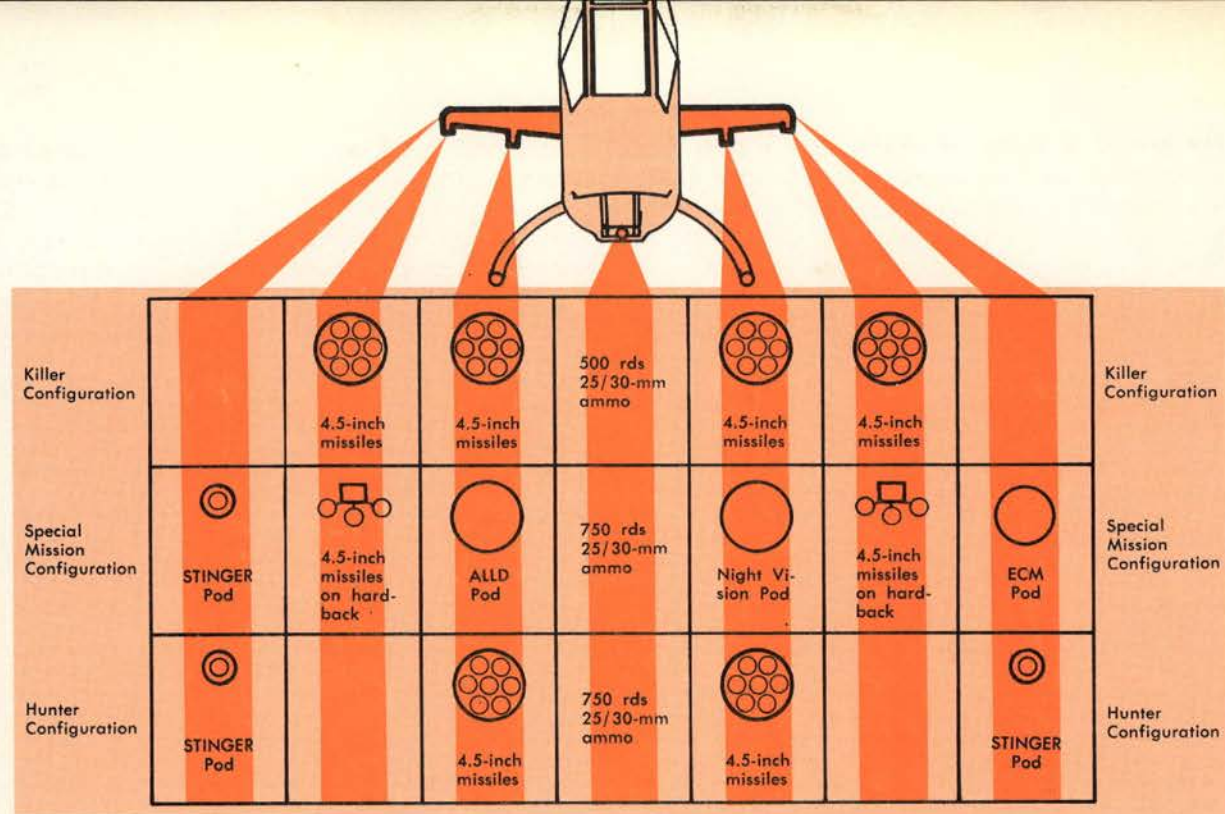
The second priority pod should be a very simple, lightweight, air-to-air missile system based on *Redeye/Stinger* components. Again this pod should be designed to attach to the tip of the stub wing. While the primary use of this system would be self-protection against hostile high performance and rotary wing aircraft, its virtue in countering hostile airmobile operations is obvious.

If additional night vision devices are required beyond the improved *PVN-5* goggles envisioned for *Cobra* use, perhaps it would be worth some effort to thoroughly investigate a night vision pod which could be attached to an inboard stores rack. This would be a fairly heavy system containing the black boxes for both pilot's and gunner's night vision devices which, due to cost, weight, and space

which would degrade normal mission performance. Due to the size and weight of this type of system, it would most likely have to be mounted on an inboard rack and would require a great deal of special purpose wiring.

Now, just a glance at the required airframe modifications needed to produce our midintensity killer. These are primarily redesigned items associated with increasing crew and aircraft survivability. Again we are constrained by the size of the present airframe and, obviously, the cost. Therefore, such items as redundant control linkages, while attractive, are probably not feasible.

Several items which would contribute heavily to survivability can be accomplished by redesign of the crew compartment. As previously mentioned, the crew armor should be reoriented to protect primarily the frontal aspect from a 12.7-mm AP round at 1,000 meters and the sides from 7.62-mm fire at 50 meters. The copilot gunner's windshield should be transparent armored glass composite. (This would have several desirable side benefits, i.e., bird strike and wire protection, no warping when rain or ice removal systems are utilized, and fewer scratches caused by maintenance personnel.)



Since this windshield retrofit would require a cockpit redesign, it should be tied to the installation of an antiglare canopy composed of flat-surfaced glass. This should go a long way toward reducing the visual detection clue produced by the curved plexiglass of the present canopy. This canopy redesign should also incorporate provisions for another crew survivability item, the escape system.

No, I don't propose ejection seats for the crew members. What I do propose is an adaptation of the "Yankee Escape System" which has been successfully tested and retrofitted to numerous combat aircraft. This ejection system weighs no more than the seat armor which we have previously removed, and it has a zero-zero capability. That is, it allows crew members to escape throughout the maneuver envelope of the aircraft down to zero altitude and zero airspeed. It employs a rocket mounted behind each crew member to ballistically eject him from the aircraft and deploy his parachute. In this proposed installation, it would be coupled with a blade removal system (which has been ground tested) which employs explosive bolts and sequences the blades from the aircraft at the 180° position. The system can be initiated by either crew member and functions instantaneously, ejecting both crew members simultaneously. It can be employed in the NOE environment and should save a large percentage of crewmen who experience the catastrophic hits and attendant loss of control which may be expected in midintensity warfare. Multiple hits from such weapons as a 23-mm and SA-7 just don't leave you much to work with.

The final area which I think should be seriously addressed in this *Cobra* improvement program is that of reliability, availability, and maintainability (RAM). Every effort must be taken to employ state-of-the-art technology to improve and simplify the *Cobra's* systems as the modifications are applied. As an example, the various wiring harnesses and bundles should be simplified and standardized using modern ribbon-wiring and provide simple provisions for built-in testing (BIT). Organizational maintenance and

troubleshooting should be simplified. As an example, the present intervalometer should be replaced and relocated. Boresighting should be simplified by the use of stores hard-backs and improved bomb shackles and sway braces. We might even manage a fire warning system, like the *UH-1*, if we push the technology of the fifties a bit.

It may seem as if I am asking a lot for the old bird, but nothing on my laundry list is beyond the present state-of-the-art and I believe the most notable feature of my proposal is those items I have *not* included. Expensive, complex systems such as fire control and navigation computers, airways navigation equipment (VOR, TACAN, ILS, Marker Beacons, etc.) were pointedly not included because we just don't need them to do the job. Let's leave these systems to the wild-blue-yonder people and get down to nap-of-the-earth and do our job. I even question the need for instrument ratings (as they presently exist) for our scout and attack aviators, but that's another story. My only hope is that this bit of writing generates some thought, discussion, criticism, and interest in the user community.



LTC DAVID L. FUNK was commissioned in Armor through the ROTC program at Indiana University in 1958. A CGSC graduate, he has served with the 101st Abn., 1st Inf., 8th Inf., and 1st Cav. Div.; and commanded C Co, 2d Bn, 68th Armor; 3d Avn. Co. (ATK HEL); 155th Avn. Co. (ATK HEL); and F Btry., 79th Aerial Field Arty. Colonel Funk is Chief, Test Branch, ARSV Task Force, USA-ARMC, Fort Knox.



The aim of this article is to give readers of *ARMOR* Magazine a brief outline of some of the tactical missile systems presently entering service, or in the late and final stages of development, in Europe today. Missiles discussed include mobile anti-aircraft missile systems (including man-portable, and vehicle- and trailer-mounted) and anti-tank missiles (again, man-portable or vehicle-mounted).

ANTIAIRCRAFT MISSILES

It is evident that Europe is, in some respect, ahead of the United States in the development and employment of short-range air defense systems. Indeed, after carrying out extensive trials with the *Rapier*, *Roland*, and *Crotale* systems, the United States recently announced that the *Roland* had been selected to fulfill the United States Army requirement for a short-

European Tactical Missile Systems

by Christopher F. Foss

range air defense system. This will be built in the United States by a number of companies.

Some European countries, e.g., Germany, will have a mix of both self-propelled anti-aircraft guns (the *Gepard*) and self-propelled anti-aircraft systems (*Roland*), while others, e.g., Great Britain, will rely only on anti-aircraft missiles (a mix of *Rapier* and *Blowpipe*).

The *Crotale* surface-to-air missile (SAM) system has been developed over the past 10 years by Thomson-CSF (who are responsible for the radar) and Engins Matra (who are responsible for the missile). *Crotale* has been in service with the South African Armed Forces for some time, where it is known as the *Cactus*. In fact, it has been reported that South Africa paid as much as 85 percent of the original development costs for the system. The Lebanese did order

Crotale, but this order was subsequently cancelled. *Crotale* is in service with Libya (who also uses the Soviet *SAM-6*), and in production for the French Air Force, who will use it for the defense of its airfields. A number of other countries are interested in purchasing *Crotale*.

The *Crotale* system consists of two 4 x 4 vehicles. One of these carries the acquisition radar, which has a range of at least 18 kilometers. The other vehicle has tracking radar and four missiles in the ready-to-fire position. One acquisition vehicle can control up to three launch vehicles. No spare missiles are carried and additional missiles would be carried by other vehicles. The missile itself has a length of 2.89 meters and a launch weight of approximately 80 kilograms (176 pounds). With its container, it weighs approximately 100 kilograms (220 pounds). The maximum range of the missile has been stated to be about 8 kilometers.

The 4 x 4 vehicles, on which the system is based, have been designed and built by Hotchkiss-Brandt, and are unusual in that they are electrically powered. Each of their four wheels has an electric motor. Their top road speed is 70 kilometers per hour and they have a maximum range of 500 kilometers. The launch vehicle weighs 14,800 kilograms (16.3 tons) and the acquisition vehicle 12,500 kilograms (13.7 tons). Maximum armor thickness is 5-mm.

According to the manufacturers, this system can be adapted to fit other vehicles, such as the *M-113*.

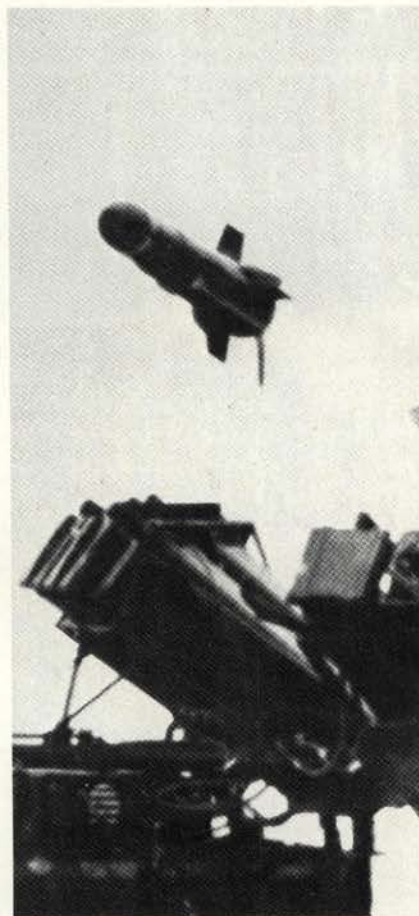
Blowpipe — Great Britain

The *Blowpipe* supersonic, shoulder-launched, antiaircraft missile has been developed by Short Brothers and Harland of Northern Ireland. The missile is now in quantity production for the British Army, Royal Marines, and the Canadian Armed Forces. Further orders are expected, as many countries have shown great interest in the missile.

The *Blowpipe* system consists of two main components, the missile and the aiming unit. The missile itself is approximately 1.35 meters in length and has four aerofoils in the nose and four in the tail. The missile is delivered in a sealed environmental container, and

remains in this container until it is fired or removed upon time of expiration. The warhead is in the center of the missile and detonates on impact. There is also a proximity fuze in the nose of the missile. The canister is approximately 1.4 meters in length and weighs 14 kilograms (30 pounds).

The aiming unit weighs 7 kilograms (15.4 pounds), including the IFF (identification, friend or foe) interrogator, and is a saddle shaped box with a pistol grip on the right hand side. Inside the box are the radio transmitter and an auto-gathering device. The grip has a firing trigger and



the thumb-operated missile controller.

Basically, when an aircraft is observed, it is tracked through the monocular sight. If it is an enemy aircraft (an optional extra is an IFF system), the trigger is pulled and the missile leaves the canister. The missile is gathered automatically into the center of the monocular field of view and the aimer then guides it to the target with a thumb-controlled joystick. When the target has been destroyed, the canister is discarded and a fresh canister is at-

tached to the aiming unit, which is then ready for immediate action.

Blowpipe is unique in that it can be fired while the aircraft is approaching; unlike the American *Redeye*, which homes onto the exhaust of the engine. *Blowpipe* has a range in excess of 3 kilometers. The missile can also be used against surface targets, such as armored personnel carriers (APC), should the need arise. A *Blowpipe* simulator has been developed as has a field test-box which weighs only 18 kilograms. This can be run from any vehicle with a 24-volt power supply.

The *Blowpipe* will be deployed by the British Royal Artillery. These units will be attached to battalions as required. The unit will consist of three men — unit commander, missile aimer, and a driver/signaler. They will be carried in the *FV 432* APC, which will also be able to carry an adequate supply of additional missiles. Other applications for the *Blowpipe* missile include 2- and 10-round shipboard mounts, mounting the system in the conning tower of a submarine (Submarine launched antiaircraft missile — *SLAM*) and a multiple mount for fitting to armored vehicles, such as the *M-113*.

RBS 70 — Sweden

The *RBS 70* is a portable antiaircraft missile under development by the famous Swedish Ordnance Company of Bofors. Development of the *RBS 70* started in 1969, although studies for such a system were started early in 1967. Development has been undertaken by Bofors and the Swedish Materiel Command. The Swiss Armed Forces joined the program a short time ago, because they have a requirement for this type of weapon.

The basic system consists of three parts — the tripod, sight, and the missile. These three parts have a total weight of 80 kilograms (176 pounds). Each part is carried by one man. When required for action, the three parts are assembled in less than 30 seconds. Only one man is required to operate the complete system. The missile is delivered in its sealed container, which weighs a total of 22 kilograms. The missile remains in this container until it is fired. The missile has two motors — a starter motor, which takes the missile outside of the container, and

the sustainer, which gives the missile supersonic speed. The missile has an optical proximity fuze, or an impact fuze. The maximum range of the missile is about 5 kilometers. Like the British *Blowpipe*, it can be used against approaching aircraft.

The tripod has three legs and a seat for the aimer. The sight unit is mounted on top of the tripod and the missile in its container is fitted.

There are two laying procedures. At coarse aiming, the operator lays both the sight and the missile in traverse and elevation, i.e., target acquisition. Fine aiming is carried out by means of a thumb lever. The line of sight and laser guidance beam is guided toward the target by means of gyro-stabilized optics and the missile follows the beam automatically.

If required, an IFF system can be added. This has been developed by Satt Elektronik, but would require a fourth man to carry it. LM Ericsson has developed a search radar for use with the *RBS 70*. This is called the *PS-70/R* and can be vehicle- or trailer-mounted. It basically consists of a cabin, which has a combat control table, communications equipment, electronics, etc. The radar scanner is mounted on the top of an hydraulically-operated arm. This C-band, pulse-doppler search-radar system has a range of 25 kilometers and can effectively control a number of *RBS 70* fire units, thus giving them advance information on enemy aircraft and helicopters. A special simulator has also been developed.

The present status of the *RBS 70* is that the final technical/tactical user trials are under way and that series production will commence in 1975-76.

Rapier — Great Britain

The *Rapier* surface-to-air missile has been developed by the Guided-Weapons Division of the British Aircraft Corporation and is now in large-scale production at their Stevenage, Hertfordshire facility. The *Rapier* is now in service with the British Army (Light Air Defense Regiments of the Royal Artillery) and the Royal Air Force Regiment (which is deployed in Germany to protect RAF airfields), where it is replacing the famous Bofors 40-mm *LAAG*, (light antiaircraft gun) which has given many faithful years

of service. The *Rapier* is also in service with the Zambian Armed Forces and has been ordered by Iran, Oman, and Abu Dhabi. *Rapier* was also

evaluated in the United States.

The basic *Rapier* system is essentially a clear-weather antiaircraft system. For operation in poor weather



4x4 acquisition vehicle for the Crotale missile system.

French Crotale system with four missiles.

Rapier mounted on the M-548 tracked cargo carrier.



conditions, an add-on *Blindfire* radar has been developed.

The standard *Rapier* system for clear-weather operation consists of a launcher with four missiles, optical tracker, and power generator. This is towed by a standard *LWB* Land Rover. Another Land Rover tows the missile resupply trailer.

One man can operate the complete system and a minimum of three men can both man and deploy the complete system. A normal five-man detachment is required for continuous operation.

A typical engagement would be as follows. The target is detected by the *Rapier's* pulse-doppler surveillance radar and is automatically interrogated

has flares in its tail to assist in tracking. A TV system is used to sense the missile's position relative to the line of sight. The *Rapier's* automatic missile guidance system directs the missile to keep it on target.

With *Blindfire* added, the following occurs. The surveillance radar detects the target and passes the approximate azimuth bearing to the *Blindfire* unit, which slews to the bearing. As soon as the *Blindfire* unit is locked onto the target, the operator is informed by the normal audio-tone. As soon as the target comes within range, a lamp indicator tells him that he is free to launch a missile. The missile is then launched and the radar tracks both the missile and the target. Once the mis-

The British Aircraft Corporation (BAC) has developed to prototype stage a tracked *M-548* vehicle fitted with the complete clear-weather *Rapier* system and a total of 12 missiles. This vehicle has successfully carried out firing trials in England. If required, a *Blindfire* radar can be fitted to an *M-113A1*, thus giving the system complete all-weather capability. Development of the mobile system based on the *M-548* is being financed by BAC and the Iranian Ministry of War.

Roland — France/Germany

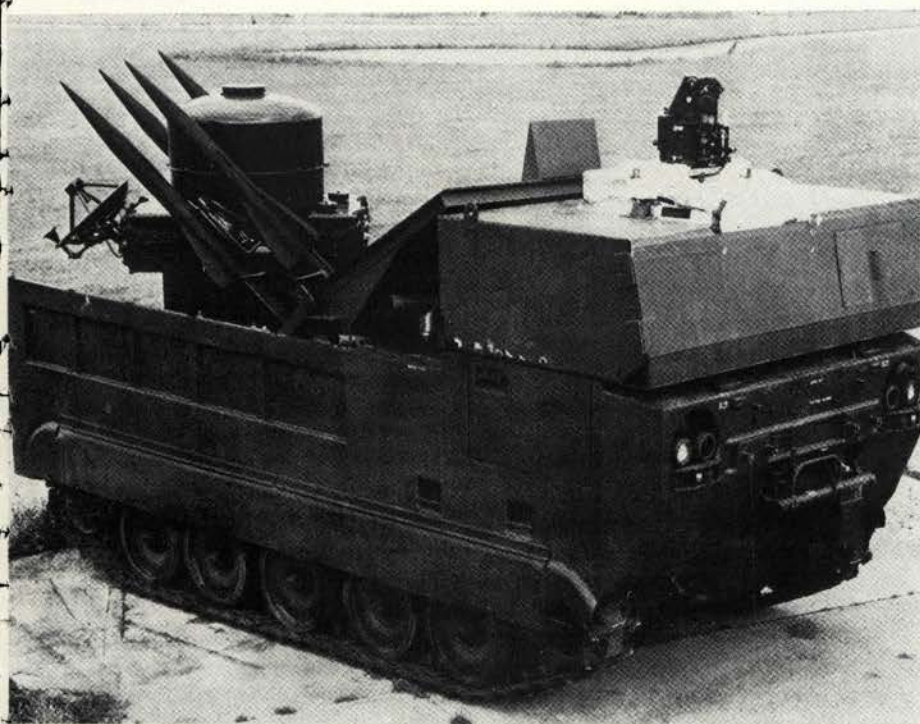
The *Roland* has been developed jointly by the French company of Aerospatiale and the German company of Messerschmitt-Bölkow-Blohm (MBB). The *Roland* is marketed by Euromissile, which has been set up by the German and French companies especially to market not only *Roland*, but also the *HOT* and *MILAN* anti-tank guided weapons (ATGW's).

The missile itself is delivered in a sealed container which also acts as its launcher box. The missile is 2.4 meters long, has a body diameter of 1.63 centimeters and weighs about 73 kilograms (160.6 pounds) in its container.

The *Roland* system is designed to be used against tactical aircraft flying at a maximum speed of Mach 1.3. Its maximum interception range is approximately 6.3 kilometers and maximum interception altitude is said to be about 500 meters. The missile has an *HE* warhead and is fitted with a proximity fuze.

Prototypes in France were mounted on a modified *AMX-13* chassis, but more recent models, and production models for the French Army, will use the *AMX-30* chassis. The Germans use the *Marder* chassis to mount the system. Both of these vehicles have two missiles in the ready-for-fire position and eight more missiles (in two four-round magazines) are carried inside the vehicle. These are loaded onto the launcher arms automatically. Each of the vehicles has a crew of three men.

Two models of the *Roland* have been developed. The *Roland 1* is essentially a clear-weather system for the French Army and the *Roland 2* is an all-weather system for the German Army. The German Air Force



by *Rapier's* built-in IFF system. If no friendly reply is received, the operator is alerted by an audio-signal. Simultaneously, the tracking head and the launcher are automatically aligned to the direction of the target. The operator gathers the target in his optical sight and commences to track it, using a servo-assisted joystick. The computer in the launcher determines when the target is within range and indicates this to the operator by means of a lamp signal in his optical field of view. When the operator sees this indication, he presses the firing button and launches a missile. The missile

sile is launched, the rest is automatic.

The *Blindfire* radar has been developed since 1968 by Marconi Space and Defence Systems Limited and is now in production for both the British and Iranian Armed Forces.

The *Rapier* system, as it stands now, is airportable, not only by standard tactical aircraft such as the *HS-748* and the *C-130*, but individual launchers and radars can easily be transported by *Wessex* or *Puma*-type helicopters. The *Rapier* can be adapted to be mounted on a wide variety of vehicles, such as the German *Marder*, or the *M-113*.



Roland 2 anti-aircraft missile system on the Marder chassis.

is also interested in the *Roland* for defense of its airfields. The United States has selected *Roland 2* which will be built in the United States by the Hughes and Boeing companies. Brazil has also ordered four systems. At the time of writing, the *Roland* system is not in full scale production.

The *Roland 1* has the acquisition scanner at the rear of the turret with the optical sight at the front of the turret between the two missiles. Basically, the commander finds the targets and passes the range and bearing to the missile operator. The operator merely has to find the target in elevation and to hold the reticle of the optical sight on it (target coincidence system). The infrared equipment locks the missile on the line of sight. The missile is then launched. Aerospatiale was the prime contractor for *Roland 1*.

MBB is the prime contractor for *Roland 2*, which is the all-weather model. On the *Roland 2*, the tracking radar searches in elevation, locks onto the target and the commander fires the missile.

Indigo — Italy

A towed version of the *Indigo*, built by Sistel of Rome, Italy, is now in service with the Italian Army. The sextuple launcher is mounted on a four-wheeled trailer. When in the firing position, the trailer is supported

by jacks, as its wheels are off the ground.

A typical *Indigo* gun/missile system would contain the following elements — two *Indigo* launchers, two anti-aircraft guns (i.e., twin 35-mm Oerlikon), five power generator trailers, a Super-Fledermaus Fire Control Center, and an LPD-20 trailer-mounted search radar.

The *Indigo* missile itself is 3.3 meters in length and has a total launch weight of 120 kilograms (264 pounds). Its warhead weighs 22 kilograms (48.4 pounds) and has an impact/proximity fuze. It has a maximum stated range of about 10 kilometers and a maximum speed of Mach 2.5. Maximum operation altitude is stated to be 5,000 meters.

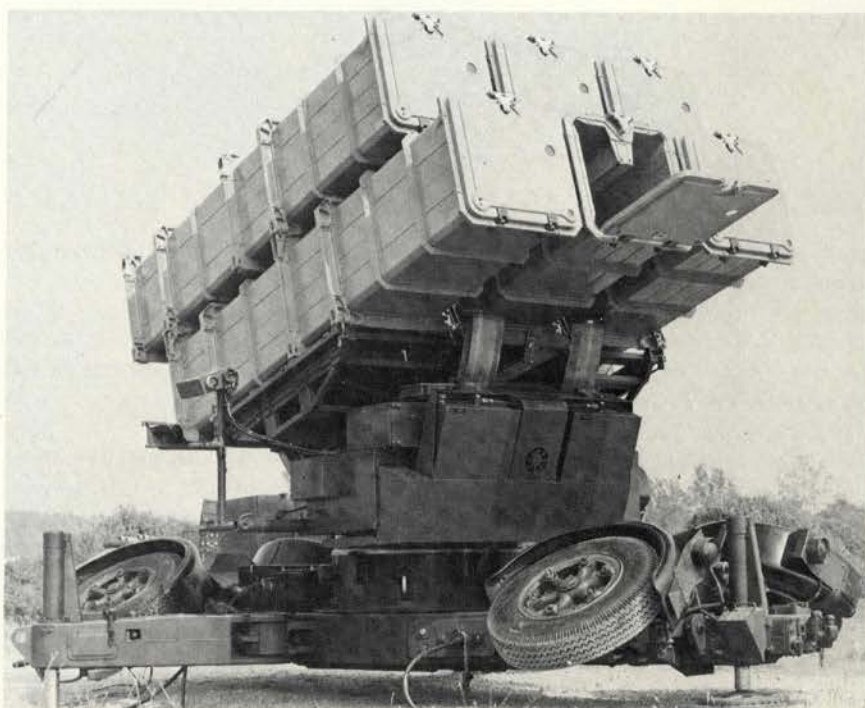
Sistel is, at present, carrying out trials with a self-propelled model of this system. One *M-548* carries the six launcher boxes and another *M-548* carries a fire control center complete with radar.

Skyguard — Switzerland

The Swiss company of Contraves is well-known for its radar systems, for example the *Super-Fledermaus*, and for the work it has done on the fire control system (FCS) for the *Leopard* anti-aircraft tank, which is now known as the *Gepard*.

Contraves' latest air defense fire-control system is called *Skyguard*. This basic radar part is now in production for the Austrian Armed Forces. *Skyguard* is a mobile, miniaturized, all-weather fire-control system for use against low-flying aircraft and air-to-surface missiles. The com-

Six Indigo missiles in their launcher cells.



plete system is mounted in a container which can be mounted on a trailer, on the back of a truck, or on a tracked vehicle (i.e., the *M-548*). The *Skyguard* can be used with most anti-aircraft guns or missiles, or a combination of both. For example, it can control two missile launchers and one anti-aircraft gun.

Contraves has under development two weapons to go with *Skyguard*. The first of these is the *Skyguard/Sparrow* air defense system. This consists of a four-wheeled carriage (as used for the famous *Oerlikon* 35-mm twin anti-aircraft gun) on which is mounted a total of four launcher cells for the *Sparrow* missile. Target designation is performed by *Skyguard*, which also controls the launcher and illumination antenna in bad-weather conditions. In clear weather, the operator of the launcher, positioned in the cabin between the launcher cells, tracks the target optically.

The second system is the *Skyguard M*. This is a highly mobile, autonomous, all-weather guided missile system for low-level air defense. It consists of a complete *Skyguard FCS* mounted on a mobile vehicle with the *SAM's* being mounted either side of the *FCS*. Various types of missiles could be fitted, according to Contraves, including *Roland*, *Rapier*, *Crotale*, *Chapparral*, and *Indigo*. This system is still under development.

ANTITANK MISSILES

The three so-called second generation missiles are discussed here — the long-range British *Swingfire*, French/German *HOT* missiles and the short-range *MILAN*. The two long-range missiles have been designed to be an integral part of an armored fighting vehicle and also can be adopted to fit any type of vehicle, from a simple truck to a main battle tank. These two missiles differ from the American *TOW* in that their operators are behind armor protection, therefore safe from small arms fire, shell bursts and the effects of NBC warfare.

Swingfire — Great Britain

The *Swingfire* long-range antitank guided weapon has been developed by the Guided Weapons Division of the British Aircraft Corporation (BAC) at Stevenage, Hertfordshire. It is cur-



A *Swingfire* being launched from a *Striker* vehicle.

rently in service with the Royal Armoured Corps (mounted on the *FV-438* and *Ferret Mk. 5*). Recently, deliveries have started to the mechanized infantry battalions, each of which has three *FV-438's*. *Swingfire* is also on order for the Belgian Army for use with their *Striker* vehicles.

The *FV-438* is a modified *FV-432* armored personnel carrier. On the roof of the vehicle are two launcher boxes for launching the 14 *Swingfire* missiles which are carried aboard the vehicle. The *Ferret 5* has a turret with two *Swingfire* launchers on either side and two missiles in reserve.

Currently under development are the following applications of *Swingfire*:

Striker

The *Alvis Striker (FV-102)* is a member of the *Scorpion* family of vehicles and is provided with a launcher box on the top of the hull at the rear, with a total of five *Swingfire* missiles. Five more missiles are carried inside of the vehicle. *Lyran* flares are carried for night work.

Beeswing

This is the Ministry of Defence designation for the infantry version of the *Swingfire*. It consists of the new one-ton 4 x 4 Land Rover. The system can also be fitted to other vehicles on the rear of which are six launchers

for *Swingfire* missiles. This system can easily be removed from the vehicle so that it can be placed behind cover. This system can cover an arc of 180 degrees. Development of the *Bee-swing* has now been completed and the system is currently undergoing formal Ministry of Defence evaluation. BAC has also developed a palletized model of the *Swingfire* which has four missiles and the various launching controls.

Hawkswing

This is the Ministry of Defence designation for the helicopter-mounted version of the *Swingfire* which is still under development. If selected, it would be fitted to the *Westland Lynx* helicopter (three missiles on either side) of the Army Air Corps. It would, however, be able to be fitted to other helicopters.

The *Swingfire* has a minimum range of less than 300 meters and a maximum range of 4,000 meters. Its main advantages over other systems is that, if required, the controller can be separated from the launcher vehicle by 50 to 100 meters. For example, the vehicle can be out of sight behind a building and the controller would be hidden in bushes with just a small part of the separation sight showing. The *Swingfire* missile is delivered in a sealed launcher box and remains in this box until it is fired. The missile itself has an overall length

of 1.066 meters and a weight of 37 kilograms (81.4 pounds).

Basically, when *Swingfire* is fired from within the vehicle, the following takes place—the operator sets a selector switch to DIRECT FIRE and aligns his vehicle sight with the target, the required azimuth and elevation angles are automatically fed into the program generator. After the missile is launched, it is gathered into the operator's field of vision by the automatic gathering phase in the program generator. The operator guides the missile onto the target with the aid of a small joystick. The shaped-charge warhead of the *Swingfire* will destroy any known tank. A wide range of test and simulation equipment has been developed for use with the *Swingfire* missile.

HOT — France/Germany

The *HOT* (High-subsonic Optically Teleguided) missile has been developed by Aerospatiale and MBB. At the time of writing, this missile is not yet in full scale production, although France has stated that she will buy this missile. Germany will probably follow suit, although they have ordered *TOW* as well.

This missile is, like most missiles of this type, delivered in a container ready for use. The complete container and missile weighs 28 kilograms (61.6 pounds). The missile itself weighs 22 kilograms (48.4 pounds) at launch, of which the warhead and fuze account for 6 kilograms (13.2 pounds). The missile has a minimum range of 75 meters and maximum range of 4,000 meters; duration of flight to the maximum range being 16 seconds. According to the manufacturers, the hit probability on a 2.3 x 2.3-meter fixed target at 4,000 meters is close to 100 percent, or at 500 meters approximately 80 percent.

The basic method of operation is as follows—the gunner lines up his sight reticle on the target and fires the missile. As soon as the missile leaves the launching tube, it is slaved to the sight line via the guidance system. This is maintained until the missile reaches its target.

The *HOT* can be adapted to a wide variety of vehicles and helicopters—on the *AMX-13* light tank, with three missiles mounted on either side of the

turret; or the *M-113* APC, with twin launchers and a total of 11 missiles; and on the German *Jagdpanzer Rakete*, with one of two launchers and a supply of missiles. When mounted on helicopters, one, two, or three missiles are mounted on either side of the machine, with the sight mounted inside of the cockpit.

MILAN — France/Germany

MILAN is now in production for the German and French armies, the first order being for 200 launchers and 10,000 missiles (half for the Germans and half for the French).

The *MILAN* (Missile d'Infanterie Leger Anti-Tank) has a minimum range of 25 meters and a maximum range of 2,000 meters. Time of flight to maximum range is 12.5 seconds. The missile is delivered in a sealed container and this weighs 11.8 kilograms (25.9 pounds). The missile itself weighs 6.7 kilograms (14.7 pounds) at launch. A normal *MILAN* team will consist of two men; one carries two rounds of ammunition (missiles) and the other carries the firing post. Basically, the firing post is placed on the ground and a missile, in its tube, is attached to it. The operator aligns the sight reticle with the target and continues tracking it. If it is within range, he launches a missile. After launching, the generator keeps the sight on the target until impact, i.e., the missile is slaved to the line of sight.

The firing post itself weighs 15.5 kilograms (34.1 pounds) including the detachable tripod which weighs 4.2 kilograms (9.2 pounds). The *MILAN* missile can also be fired from armored cars and armored personnel carriers.

It can be seen from this very brief survey that there is a lot of work being put into anti-aircraft and anti-tank missile systems in Europe at the present time.

It must also be said that there has been a great deal of duplicated effort within NATO on these systems e.g., there are three anti-aircraft missiles (*Rapier*, *Crotale*, and *Roland*), three long-range antitank missiles (*TOW*, *Swingfire*, and *HOT*), and two short-range antitank missiles (*MILAN* and *Dragon*) either in production or en-

tering production, most of which were designed, in general terms, to similar requirements.

When the new range of missiles is developed, much more effort must be put into trying to get standard systems approved, not only to save money, but also to help NATO standardization in time of war.

How will these missile systems affect allied armor? The anti-aircraft missiles will hopefully allow allied armor freedom of movement from air attack and allow armor to be moved to the threatened area. In the opinion of the writer, the Germans have the best idea i.e., self-propelled, a mix of anti-aircraft guns and missiles. The mobile anti-aircraft gun of the *Gepard* type would be very useful against enemy armor, although care would have to be taken when employing this expensive vehicle.

The antitank missiles would enable the infantry to hold and contain Warsaw Pact Forces (WPF) armor attacks and keep allied armor for offensive operations.



CHRISTOPHER F. FOSS has written numerous articles on armored vehicles for several magazines, including *ARMOR*. He is also the author of *Armoured Fighting Vehicles of the World* (1971 and 1975 editions), *Artillery of the World* (1974) and *Janes Modern AFVs* (1974). He has written four of the famous *PROFILE* series on *The Abbot SPG*, *The FV 432-Series APC*, *Commando and Twister Armoured Cars* and *High Mobility Vehicles*, and *The PT-76 Light Amphibious Tank Family*. He also contributes to *Janes Weapons Systems*. Mr. Foss is currently the weapons correspondent for the British magazine *DEFENCE*.

PROFESSIONAL THOUGHTS

In the March-April issue I mentioned in my Editor's letter a desire to publish short pieces reflecting professional thoughts from ARMOR's readers.

We have received a few, and with this issue we will begin a new feature titled "Professional Thoughts." Hopefully many who are too busy to write full articles may find time to express themselves in a "Professional Thought."

—Editor

THE DELTA TROOP MYTH

I would like to call to the attention of *ARMOR* readers an erroneous — and possibly damaging — belief which many Armor officers appear to hold: that the air cavalry troop is really under the control of the squadron commander. This article does not argue whether Delta Troop in theory should or should not be under his control. Rather it calls for a realistic look at the command and control of this important tactical asset.

The air cavalry troop of an armored division is a resource primarily of the division commander and only incidentally of the squadron commander. This is so not because it is complex, alien, or of marginal value — I do not believe it has any of these characteristics. It is just that the air cavalry troop represents too large and too valuable a portion of the division commander's aviation assets to expect him to pass control of it to his cavalry squadron commander. If one considers the brigade, support command and division artillery aircraft as permanently committed — a premise which I think is reasonable — then a squadron commander has 9 scout ships to the aviation battalion commander's 4, and 17 utility ships to the latter's 33. In the light of these figures I do not believe the division commander will routinely, or even often, permit one of his lieutenant colonels to determine and supervise Delta Troop's tactical employment.

The squadron was a convenient place to put the air cavalry troop when the latter was introduced into the division, for the squadron was a thorough combat unit with the esprit and professional attitudes one hoped the troop would catch and hold. It also provided an admin-

istrative base for an unique unit. Lastly, an Army-wide drive to limit to three the number of maneuver companies per battalion had skipped the cavalry squadron; the spaces were there to be diverted without exceeding the division ceiling. In a constant struggle to absorb new equipment and new skills into the division without increasing overall strength, the Army probably was wise in choosing the squadron to bed down the air cavalry unit.

But the air cavalry concept is established now. Next we need to see if there is a better place to assign Delta Troop. In garrison it belongs, I believe, closer to those who will allocate and manage its use in the field or in combat.

There is an associated problem. Because Delta Troop is so rich an asset, it disappears entirely, or nearly so, from the squadron commander's hands. Yet he needs some organic air, perhaps an air platoon engineered directly to his requirements, but modest enough in size to remain a squadron asset. He also needs his own command helicopter, not one "borrowed" from the Delta Troop. The squadron commander should also command in garrison those aviation resources he will employ in the field.

If those changes are not made, the cavalry squadron commander should, at least, stop deceiving himself as to his role in combat; he will babysit — not command — Delta Troop. And Armor officers should accept his rude fact in their thinking and writing.

—Brigadier General Hugh J. Bartley
Chief, Army Section — JUSMMAT



**"We stand in the West; we are fully prepared;
Let the enemy come today.
We are on guard, our fists are hard,
We shall stand in the west at bay. . . ."
"Die Wacht auf Kanal"**

We stand in the West; but are we fully prepared?

The October War showed us that we must fight outnumbered, and win. The threat's introduction of huge numbers of antitank guided missiles (ATGM's) threatens to drive our tanks from the battlefield, while allowing massed enemy armor and artillery to rout our forces.

How are we to survive and win? By training to fight outnumbered as a combined arms team in circumstances that approximate the threat as closely as is humanly possible.

That's a tall order indeed. It's more complicated than that when you consider the monumental cost of field training exercises and gunnery training.

Many agencies are addressing these new training problems, and several new techniques have been developed. Realistic Training (REALTRAIN), Effectiveness Training (EFFTRAIN), and several new war game simulators are already finding their way into our training program.

These new trends are pointed at the individual soldier/crewman and seem to be doing the job. But how about the

commanders and their staffs? The CPX is still a very effective way of training them, but it needs to be revitalized and reoriented to fit the new demands.

If asked, most commanders will tell you that CPX's are fine, but take too much time to prepare and lack the realism needed.

That's the problem the Armor School faced: how to get realism into a CPX, while reducing preparation time. *On Stage*: "Map Maneuver '75"

Map Maneuver '75 is a free-play, partially - controlled, MAPEX/CPX system. It includes a computer model specifically designed to support military tactical and logistical problems, provides faster and more accurate results, insures objectivity, and possibly more important, provides historical data that can be studied and analyzed by the players.

This program (currently in use at USAARMS) accommodates the employment of armor, mechanized infantry, ground and air cavalry, and all of the combat support and combat service support elements up to division level. The computer data bank includes a

Map Maneuver '75

by Captain Ernest L. Childs

threat segment capable of fielding a motorized rifle regiment with all of its normal support units. The program can be used to play any unit or combination of units from platoon and section level up to full maneuver brigades. It can be played on any map and use any scenario. It is a highly complex program, yet simple in its operation.

The computer functions are designed to accommodate the employment of conventional forces with all of their normal supporting weapons systems. Artillery, close air support, mortars, attack helicopters, and intelligence functions are handled as they would be in actual combat. Task organizations from team to task force level are programed to allow the cross attachment of units to accomplish any specific mission.

Unlike the manual CPX system, the computer program can apply the real-world effects of weather, terrain, and weapons effectiveness in a timely manner. Battle results are fed back to the players through the platoon leaders much as they would be in actual combat. The computer provides update information at 15-minute intervals insuring a constant flow of current information. How the players react to this information is totally free play and sets the course of the exercise.

Within the program, rates of move-

ment, casualties, and rates of attrition are computed on the basis of relative combat power (ratios) and the techniques of employment (type of attack/defense). Task organizations and method of deployment have a direct relation to the firepower ratio for each force. The system is responsive enough to permit the maneuvering and employment of forces in response to the orders of the player commander.

Typical units are represented in the computer's historical files at their TOE authorized levels. This allows a player unit to use its own equipment. This is very important to units which may be using nonstandard equipment, such as *M-48A3* tanks in lieu of the *M-60A1*.

The logistical file allows the establishment of TOE levels at any percentage desired. It also provides the driving force for S-1/S-4 play by positive interaction with the other conflict programs. Requirements for resupply and for replacement are generated from the conflict programs, reported as status or losses by the platoon leaders, and processed by the battalion. Real time delays are imposed by the control staff to simulate land movement and handling of supplies and equipment.

Two to four computer terminals are used simultaneously to operate the interactive programs and three historical files (weapons, unit, type unit). This somewhat elaborate setup can be tailored down to suit a smaller operation, if necessary. A computer supported operation being controlled by a Maneuver Training Command (MTC) team can operate from two terminals at a remote site by leased line at a very nominal cost. A location anywhere within a 3,000-mile radius of Louisville, KY, can be supported for under \$300 for an 8-hour exercise. This makes the system particularly adaptable to a Reserve/National Guard Multiple-Unit Training Activity (MUTA) CPX. (The MUTA MAPEX is addressed in a pamphlet available through the Army Wide Training Support Department, Fort Knox, KY 40121.)

Very little prior preparation is required, since only starting information is needed to initiate the play. This aspect greatly reduces preload writing requirements. Since the system is played in real time and generates its

own requirements for essential elements of information, no artificial influence by the control staff is needed.

To begin play, the control staff issues an operations order with annexes and overlays from the higher headquarters they represent, i.e., if a brigade is being exercised, a division level order is issued, a battalion would receive a brigade order, etc. Sufficient planning time is then allowed for preparing and issuing orders down to the platoon leader level.

Once this planning phase is complete, the execution phase begins. Here the players are required to execute the orders they prepared. Actions and orders situations are developed by the computer in real time. The player is forced to employ all his assets and supporting weapons in response to activities generated by his own orders. Either force can win. If a commander or his staff is slow in reacting to changes on the battlefield, he will find himself paying for his mistakes.

An error in judgment by a player will come back very quickly in the form of mission failure. Overlooked details will lead to devastating results, thus forcing the players to make timely, accurate, and coordinated decisions.

SITUATION:

A pall of smoke hangs in the tension charged air. Several officers are poring over the situation map. The battalion is in trouble. Its mission:

Hold the IDP for four hours. It is now 1043 hours. One hour and seventeen minutes to go.

"STEEL TRAP 3," the radio breaks in again for the 100th time in what seems an eternity.

"My 26 element decisively engaged. 16 and 36 being probed by estimated enemy company-plus. Enemy artillery heavy. I need assistance. Relief of 26 urgent."

"TRAP 16"

Similar reports came in from B Company earlier. The reserve company is already enroute to the next delay line, and may not be able to get to A Company in time to relieve Alpha 26. The flank battalions are holding. A very tough problem. Do you request the commitment of the brigade level

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MINARTY
ARTILLERY FIRE MISSION COMPUTATION
TARGET UNIT ID? 09911
FIRING UNIT(S)? 013
NUMBER OF VOLLEYS? 2
01305 ROUNDS REMAINING: 0
01310 ROUNDS REMAINING: 273
01320 ROUNDS REMAINING: 273
01330 ROUNDS REMAINING: 273
MOUNTED/DISMOUNTED(M/D)? M
ACTIVITY CODE? 1
PERSONNEL LOSSES:
  2 KIA
  1 WIA
EQUIPMENT LOSSES:
  2 AKM 7.62
NONE

```

```

TARGET UNIT ID? 09911
FIRING UNIT(S)? 013
NUMBER OF VOLLEYS? 6
01305 ROUNDS REMAINING: 0
01310 ROUNDS REMAINING: 267
01320 ROUNDS REMAINING: 267
01330 ROUNDS REMAINING: 267
MOUNTED/DISMOUNTED(M/D)? M
ACTIVITY CODE? 1
PERSONNEL LOSSES:
  6 KIA
  3 WIA
EQUIPMENT LOSSES:
  2 PT-76 LT TK
  2 BRDM-2
  1 14.5MM HV MG
  5 AKM 7.62
  1 PKS 7.62MG

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TARGET UNIT ID?
E+U
END

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READY

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reserve? No, you haven't committed your own. Can TRAP 16 hold long enough for the reserve company to retrace its move? Maybe. How about asking brigade for permission to delay early.

This situation developed during a recent field test of the USAARMS system.

The commander, a veteran Armor battalion commander, decided to see just how well his staff and subordinate commanders would react to an active situation with limited guidance from him. The situation every quickly got away from them and he was soon actively directing the battle.

At the critique, a discussion of this situation revealed that several errors combined to create the problem.

Several small pieces of intelligence had been received by the S-2, but not passed on to the S-3 and FSO. The initial deployment of the battalion did not take full advantage of the terrain available, causing a weakness in the western half of the battalion sector. Supporting fires, although planned in detail, were not brought to bear in a concentrated effort.

Was this situation unusual? Not at all. Staffs that don't normally work together in a combat environment lack experience in essential intra-staff coordination. Combat requires it; our training must exercise it.

The USAARMS program allows the play of all current tactical operations as well as the testing of new ideas and concepts. It is designed to provide the driving force for command and staff

actions at the company, battalion, and/or brigade level; the primary interest is to force actions, orders, and proper staff coordination.

Event probes can be inserted into the play to test specific player responses. These probes can be used very effectively by the control staff as an evaluation tool during the critique phase. The probe may be as simple as an intelligence agent report that would or should be posted on the S-2 map, or could be a much more complicated requirement designed to exercise the entire staff. In any event, the probe is developed with a specific objective in mind, and should be followed through to the critique, if it is to be of value.

In the past, controllers at the player level were forced to make decisions and directly influence the play of the manual exercise, however, they are now free to monitor and evaluate player activities. This aspect greatly enhances the CPX as a teaching and evaluating technique. At the end of this exercise the commander *knows* whether he and his staff were successful or not.

Players are not used in the control system. This technique maximizes player participation, but increases the control burden. A single battalion exercise requires 12 control personnel, specifically trained in the operation of this system. Specially prepared pamphlets are now available to aid in providing this training.

Since the USAARMS model can be played on any map sheet, employ any type of scenario, and can be operated

from a remote location, Active Army use of the system will be handled under the supervision of the Armor School. Control staff organization, exercise scenarios, and operational information will be provided on request. The system, although now available, is still being developed for field use. Further developments will be noted in *ARMOR*.

USAR and NG commanders should contact their Readiness Region representative for detailed information concerning the system.

Annual CPX requirements for Reserve and National Guard Units and the constant need to exercise Active Army units, more than justifies the adaptation of the USAARMS system to meet the needs of the training mission.

The USAARMS Map Maneuver '75 is by no means the ultimate answer in CPX operation, but does incorporate lessons learned in refining and presenting real world play in a sterile environment.

Outnumbered as we are, we have to find a means of overcoming the odds. New tactical techniques and superior training will give us the edge we need, but it must be constantly honed if we are to succeed.



CPT ERNEST L. CHILDS was commissioned in Armor upon graduation from Infantry OCS in 1965. A 1968 graduate of the Armor Officer Advanced Course, Captain Childs has served as an OCS tactical officer, Cavalry platoon leader, executive officer, troop commander and squadron staff officer. In Germany, he served as Chief, Armor Division, 7th Army Training Center, Combined Arms Training Center. A developer of the Map Maneuver '75 system, he is currently serving as an instructor at the Armor School.

On Military Social Customs

ARMOR often carries short pieces on customs and traditions of the military services in its issues. I have been asked on several occasions why we don't also publish some contemporary views on social customs in the Army. Recently, I wrote Mrs. George S. Patton to ask her views on such a feature in *ARMOR*. After receiving her reply I also asked her if I might share her frank and enlightening reply with the *Armor* community.

—Ed.

Dear Colonel Boudinot:

I can't tell you how pleased and complimented I was to have you write to ask for my opinion on updating interpretations of Army social customs via the pages of *ARMOR*.

You tossed out a real challenge. I don't know a subject more guaranteed to court controversy than "military social customs," as you yourself have implied. In the first place, it is human nature to resent anyone who sets himself up as an authority on the way you or I behave or conduct ourselves, especially when he (or more often *she*) points out in a public way that our own "modus operandi" is incorrect! I have seldom felt more hostility in a room full of women than when they were getting a "protocol" lecture, and believe me, I have been on the receiving end of plenty! The mistake most lecturing authorities on protocol make, it seems to me, is in taking a firm position on matters which are, in fact, "moot." Somehow they can't distinguish between the "nice to know" and the "need to know" in military customs; the military practice which is part of a service member's official conduct as versus the social "optional" which may or may not cast him or his wife in an unfavorable light, depending on who is observing and how that observer feels about it. Personally, when in rare instances I have been snared into conducting a "protocol lecture," I have been obliged to base my presentation on a recital of how I, time and again, have committed dreadful social faux pas . . . but have lived to tell the tale. It has saved my hide!

Nonetheless, you are right. The subject of military social customs presents a real dilemma in today's Army, and it has not been tackled head-on.

Here's what I believe our situation is: I think that even the older military veterans (both husbands and wives) among us have lost a lot of the courage of our convictions when it comes to customs and heritage of the service, in the wake of the "Protesting Sixties" and "Women's Lib"

and all the other things which have battled traditions in recent years. Mini-skirts at White House receptions, barefoot wedding ceremonies, disrespect for the trappings of patriotism — all these and many more have undercut the foundation of social custom, even those peculiarly military. In some cases, it was about time. It is good to see false idols toppled and the ridiculous rules swept away.

Example: When my husband was at flight school as a colonel and I was the Oldest Living Student Pilot Wife, I was invited to attend a meeting of the advisory board of the local officer's club as an "ombudsman." The board chairman announced that the Club was disturbed at the costumes the student wives were wearing to its functions, notable among them "evening pajamas" (a daring new fashion style!). The club officer had worried himself to death over the regulations prohibiting slacks on women in the Club at night, finally coming up with a new version which said, in effect, "Ladies are permitted to wear evening pajamas in the Officers' Club after 1800 hours, provided they walk in such a way that the Club Officer does not detect that the lady is wearing trousers and not a skirt."

My own feeling at the time, expressed to the board but not commented upon by them, was that few ladies, especially those young and new to the service are deliberately trying to dress or act in a way which is improper. Their versions of what is fashionable and becoming are bound to differ, depending on their background and experience. Those few who are actually *flaunting* convention would do it anyway, anywhere. Eventually they will make their peace with their environment or will leave it. The others will be either individualists or sheep, no matter what we tell them.

The best teacher has always been the example of someone they respect . . . not a paper model but a living, breathing example. We have had many lovely and beautifully-turned-out senior ladies in the Army, but some of the finest have not been known for their fashion sense, yet their husbands have prospered and they have been admired for their other exemplary qualities.

We always feel more comfortable if we can be sure we are right, or at least not *wrong*, when we enter a new setting. Rather than try to arbitrate firmly on military social issues, either from *ARMOR's* pages or a podium, isn't it better to give our young (and older) Army types the confidence they need by letting them know:

(1) *Where to seek advice . . . such as in good and timeless (rather than supposedly timely) resources — for example; Emily Post, the Officers Guide, official diplomatic*

protocol guides for the universal rules; the post or unit adjutant, the sponsor and wife, the wise neighbor, for the local customs — as a starter.

(2) *That their own background, however far from hardcore military, has not been a dead loss, but brings dimension to them as military people.*

(3) *That they may, in many cases trust their own judgment of good taste and good sense to get them through.*

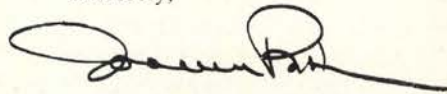
(4) *That what is new or different is not necessarily wrong or destructive to our way of life . . . anymore than is something which has survived the test of time because it touches our hearts, rather than our practical sense.*

I'd rather see less time spent by seniors agonizing over whether young couples not long for this Army need invest in calling cards, than making the effort to let them feel fully welcome amongst us, by whatever means: asking them to drop by informally, after dinner, for a get-acquainted visit (translated "calling," even without cards!) or making a special effort to remember them as individuals. (How simple it is to ask *them* to help *us* with failing memories, by reminding us, when we see them in the commissary line or at other functions, of their names and where we met before.) I have always felt that those rules which are *truly official* will be kept by those who care to be a full part of us, when they are asked to keep them. Those who do not care won't be with us for long, so never mind. As for the other so-called "rules" . . . I am in favor of tolerance and bending, for kindness' sake, in matters optional and for setting one's own standards, in such cases, for one's self. Such is the spice of life, Army or otherwise!

When we were firming up the Armor School Ladies' programs four years ago, we took a poll of any who would reply from among student and staff wives, to see what they would like to learn more about, if it were offered. A very large statistic indicated a desire to become better informed on the *real* Army traditions, their origins and why they are kept. What they specified were things like flag and parade courtesies, rather than fashion arbitration. That seemed to us, given the very mixed composition of our young Army at the time, to speak for their genuine longing to give meaning to the Army life as they were living it . . . to get the facts, but also to engender a little emotional involvement in order to feel esprit for their environment. It just might be possible that such is still the case. Among those of us who, because of our great age or exalted status, are "supposed to know," yet commit flagrant violation of courtesy, kindness, and protocol in being too proud to ask the difference . . . or to detect it, I am *sure* it is.

So after all that, I can only leave you the ball back in *ARMOR's* corner again! An article on "where we are today" in Army customs might well be in order, if it can be justified as a "military subject" and pertinent to the bulk of your readers. At least it might start the "communications net" working at the local level. As for a continuing Ann Landers column approach to the subject, I would avoid it like the plague!

Sincerely,



Joanne Holbrook Patton

"SIR?"

It was early afternoon on a warm, sunny September day in the late 1950's, and our 3-day field problem was nearing completion. Our tank battalion and an armored infantry battalion of our combat command had been opposing each other in a practice battalion test. For control purposes, our battalion S-3 had parked his and the forward air controller's jeeps side by side on top of a hill. Since this was a prime vantage point from which to watch the show, they had been joined by the combat command commander, a somewhat crusty colonel who was called "Smiling Jack" by those under his command, but only when he could not hear. The S-3 had explained the exercise and noted that the radio in his jeep was tuned to a frequency that every other radio in both battalions was monitoring so that maximum control was available.

At this point our battalion commander arrived, completely out of breath. Unlike the others who had driven up the easy slope on the hill's north side, he had approached from the south, leaving his jeep with its driver at the base and climbing the steep southern slope on foot. Lieutenant Colonel Water (not his real name of course) was not the usual Army officer. He was the shortest officer I've ever known, not more than 5 feet tall, and slightly rotund. His normal voice was high-pitched and the more excited he became, the higher it rose. As he reached the hilltop "Smiling Jack" wasted no time in greetings, but instead pointed down to the colonel's vehicle and his driver who had assumed a comfortable prone position nearby, at the same time commenting on the advisability of placing vehicles and men in concealed positions when airstrikes are imminent. Our leader hastened to comply and, leaning over the slope, he shouted for his driver to move the jeep. His voice carried to the bottom of the hill and was heard by the driver, but the words were unintelligible. The driver, not one to think on his feet in order to surmise what his leader might want, ran forward to the start of the slope, stopped, cupped his hand to his ear and yelled at the top of his lungs, "SIR?" Still not understanding the answer, he advanced some 10 feet up the slope and repeated his question. The sequence of the battalion commander yelling his instructions to move the jeep, then his driver climbing further up the hill, cupping his hand to his ear, and yelling "SIR?", was repeated several times. Each repetition added to the little colonel's frustration and aggravation. "Smiling Jack's" queries as to when did he intend to move the jeep did little to help calm the battalion commander. By the time the sequence had been repeated three or four times he was so mad that he was jumping up and down with rage. Looking around in frustration as the driver once more moved up the hill, his eyes fell on the radio microphone in the S-3's jeep, close at hand. Thinking only of the fact that his jeep's radio was tuned to the same frequency and that the driver might hear it, he grabbed the mike and in a voice that carried with it all of his anger, frustration, and command authority, shouted over the radio, "IF YOU MOVE ONE MORE INCH, I'LL BUST YOU ON THE SPOT."

The reaction was immediate. Two battalions screeched to a halt, tanks almost collided as fast reacting drivers jammed on brakes in panic, infantrymen hit the ground, and one squad was reported to have grabbed entrenching tools and begun digging in. One noncom stopped in midstride with one foot in the air and held that position until his CO assured him that it was okay to move. Every man in the two battalions froze like statues. All that is except one; the old man's driver ran another 10 feet up the slope, cupped his hands to his ear and yelled — "SIR?"

LTC David C. Holliday (Retired)



An Alternative

THE BALANCED COMBINED ARMS BATTALION

by Captain Duncan F. Stewart

In the past few months a number of articles in our professional journals have been devoted to the examination of combined arms units. Also casting light on this subject were articles describing the lessons of the most recent Mideast War. Major Mace's article in *ARMOR* (July-August, 1974) very succinctly showed that combined arms units do not present major new administrative problems. Captain Caine, in his recent *ARMOR* article ("Dragoons and Hussars: Tomorrow's Maneuver Battalions," November-December 1974), reviewed many of these articles as a prelude to

presenting his proposed Hussar and Dragoon combined arms battalions.

Prior to stating his own recommendations, Captain Caine summarized a number of possibilities. In passing, he states that a "balanced battalion (six tank and six infantry platoons) has some favorable employment characteristics, but may be too great a departure from our 'time-honored' triangular style." The combined arms organizations he proposes, though, are also a great break with tradition. Unit options should *not* be excluded for reasons of tradition alone.

More importantly, the Hussar and

Dragoon battalions Captain Caine proposes go only part way in solving the dilemma of attachment and detachment. Obviously, tailoring of units will occur. Captain Caine has presented one way to minimize the confusion involved while maintaining combat effectiveness. But the all-Hussar or all-Dragoon battalions still invite much (too much?) tailoring. The balanced combined arms battalion may offer a better solution, one minimizing attachment and detachment while maximizing efficiency.

The purpose of this article, then, is to propose a balanced combined arms

battalion, theorize on its employment, and recommend field tests for it and other proposed organizations. Two statements are taken as postulates. First, there is a need for some sort of combined arms battalion. Second, there is a pressing requirement to minimize the self-inflicted administrative wounds of attachment and detachment.

Let's start with the building blocks. The two cornerstones of any combined arms organization are tank and infantry platoons. Weapons platoons, company headquarters, and maintenance sections round out the list. Few changes are necessary at this level. The Weapons Platoon will add a strong *TOW* section. The headquarters and maintenance sections must add the various skills required to support both types of combat platoons. The maintenance section, especially, will need a mix of turret and tracked vehicle mechanics capable of nursing both MBT's and MICV's simultaneously. All companies will need *M-88 VTR's* instead of *M-578's*.

Company Organization

General company organization is the next problem. In a balanced battalion of six tank and six infantry platoons, there are two choices. One organization would be three companies of four line platoons, the other, four companies with three combat platoons. The platoon mix in the first case would be two tank and two infantry. In the latter, it would be two and one, tank or infantry predominant. Taking into account the

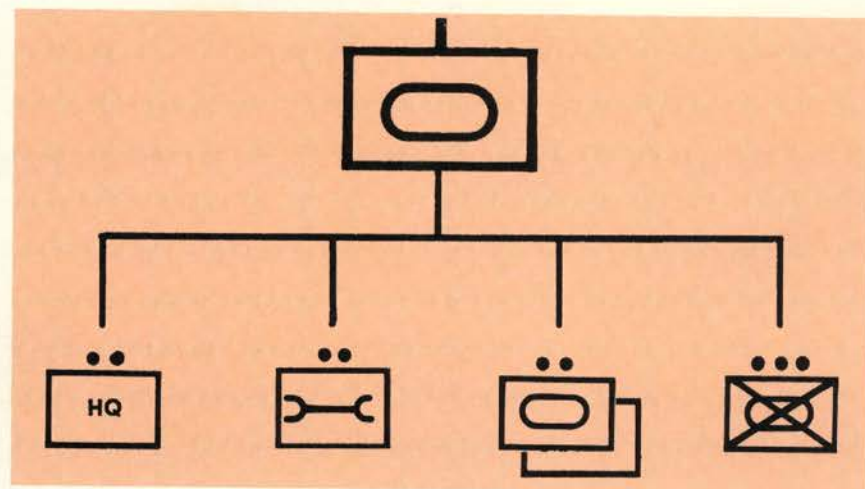


Figure 1. Hussar Company

postulate of minimizing tailoring, the three-company option would have to be eliminated. At this level, weighted teams are, by far, the usual choice of commanders. The result, then, would be what Captain Caine calls Hussar companies (two tank and one infantry platoons) and Dragoon companies (one tank, two infantry platoons).

Next, the Weapons Platoon. Both companies could have one. But is one really necessary in the Hussar company? A metaphor is useful here. In a tactical situation, a commander needs two tools. The first is a precision drill with many bits — the Dragoon company. This drill should have a weapons platoon bit for deliberately boring holes in enemy formations. The other tool, the Hussar company, should be a shaped charge, capable of blasting through an obstacle, causing shock and confusion. The support of a weapons

platoon is not as critical in this case. The Hussars should obtain such support, as needed, from the elements of the Combat Support Company. Adding the Company Headquarters and Maintenance Sections, the results are the two companies shown in figures 1 and 2.

Combat Support Company

The Combat Support Company does not need to change much from the present TOE to support a balanced combined arms battalion. The biggest addition would be in the Antitank Platoon. Twelve *TOW* systems on mechanized infantry combat vehicle (MICV) chassis (at least!) are a must. Their worth and devastating capability have been demonstrated amply in Vietnam and the Mideast. The Mortar Platoon should have more punch also, six tubes instead of four. This, of course, would be an immediate change. As Captain Caine suggests, this element eventually should have cannon instead of mortars. The cannon, though, should be mounted on a common chassis (MICV or MBT base) for ease of support of armor and mechanized infantry elements. The recon platoon will undoubtedly trade in its *M-114's* for whatever new scout vehicle is finally chosen. Last, but not least, the Combat Support Company should have an AVLB section. This combat support capability is a must in a unit with MBT's (figure 3).

The Headquarters Company — brains and service support — should

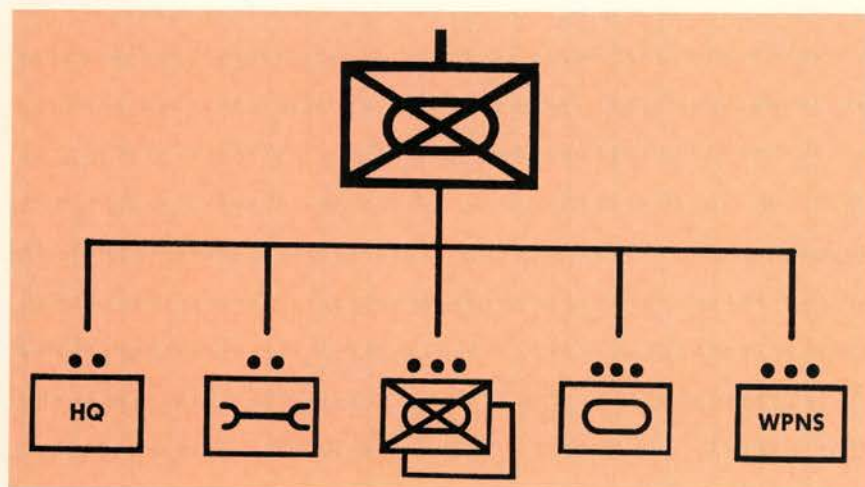


Figure 2. Dragoon Company

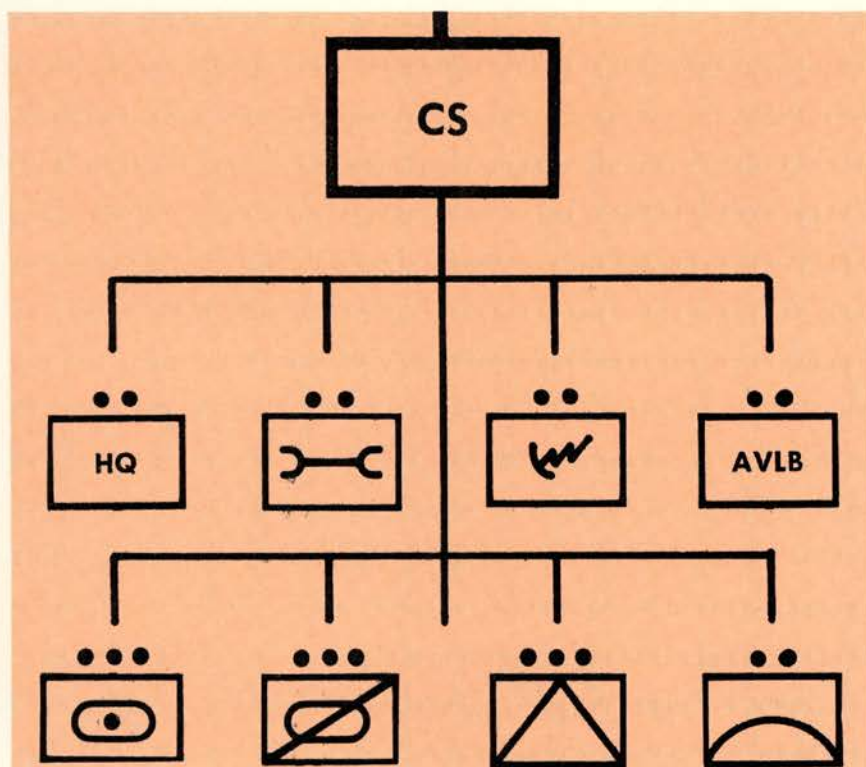


Figure 3. Combat Support Company

change little. Another mess team will be required, as well as some other small manpower adjustments. The S and T platoon will experience the most change (figure 4).

What does it all come to? A balanced battalion (figure 5) of about 900 personnel, 30 tanks, and 24 MICV's capable of attacking, or defending on any mechanized battlefield, and doing so with minimum reorganization. Let's now examine how.

Offensive Actions

Reorganization of the battalion for offensive action should be minimal. In movement to contact and screening operations, for instance, the battalion has the mobility to put sufficient forces forward while maintaining a ready, mobile reserve. The Dragoon companies would lead, making the best use of their infantry-weighted capability. The Hussars would trail in a traveling overwatch role, one Hussar company to each Dragoon company (figure 6). With this strong support, the two leading companies could cover broader frontages without fear of defeat in detail. This is of importance

in fast, mobile actions in theaters such as Central Europe or the Mideast.

Meeting engagements and deliberate attacks are also the forte of the balanced battalion. Instead of "two up and one back" the commander has a choice between "two up and two back" or three companies attacking with one in reserve. And both of these options are available from battalion assets. It is possible to foresee battalion operations involving a ground attack by two

companies, a reserve of one company and an air assault by the remaining company (figure 7).

There will, of course, be times when pure tank or infantry battalions or minimally weighted forces will be necessary. Tank and mechanized battalions under present TOE's have no problems here, their greatest difficulties occur in cases requiring task force organization. But what about making a battalion of a single arm from the various suggestions for combined arms battalions? The six and three organization Captain Caine proposes makes the creation of pure (or nearly so) battalions quite difficult. The three "minority" platoons are from three companies. They cannot be detached in one company without breaking the "majority" organization (figure 8a). The balanced battalion, on the other hand, can go "pure" by trading two infantry and two tank platoons internally and then attaching/detaching two complete companies. (figure 8b). Similarly, a balanced battalion can become weighted (three and one) without leaving another battalion short-handed.

The ability to conduct offensive operations with minimum reorganization also applies to envelopments, pursuits, and exploitations. Doctrine suggests armor-heavy, mobile units for these actions. Balanced battalions fill the bill here, providing an organization that is already well organized for the semi-independent actions involved.

The balanced battalion is just as effective in minimizing disorganization

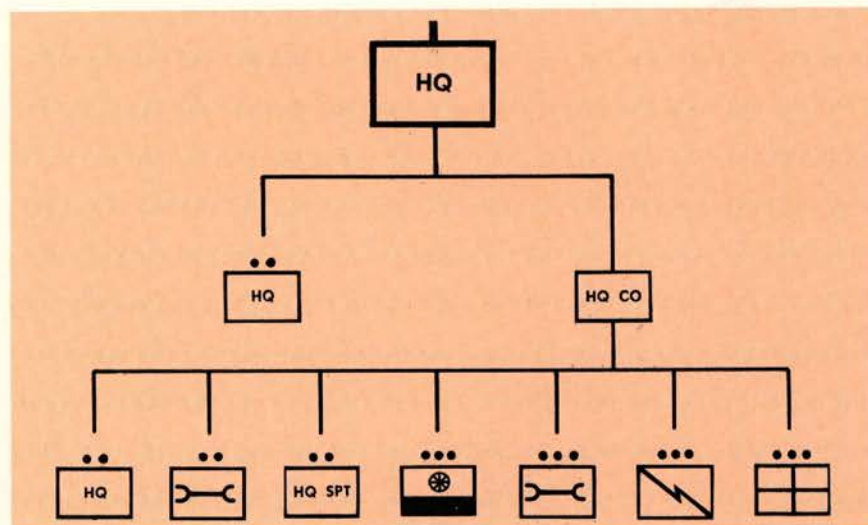


Figure 4. Headquarters Company

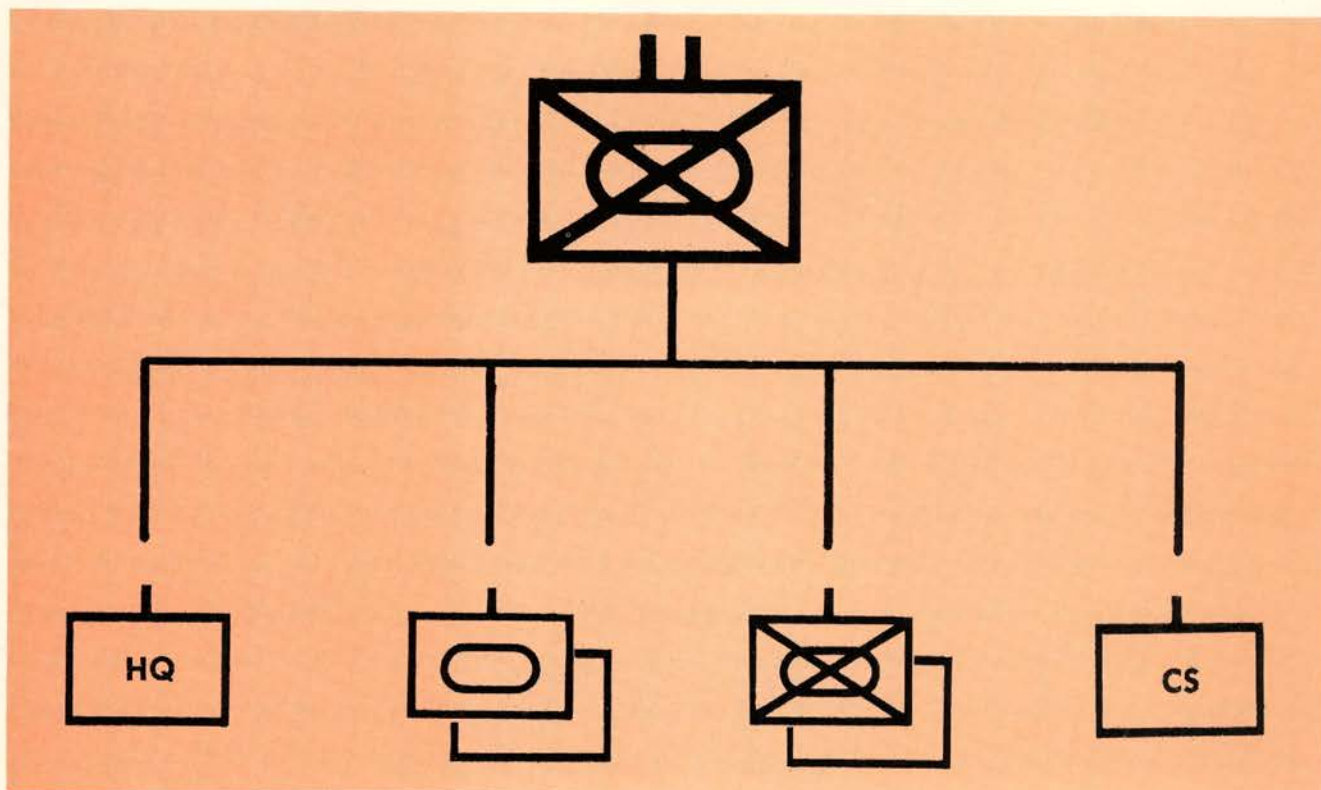


Figure 5. The Balanced Combined Arms Battalion

in defensive operations. School solutions for covering the general outpost force (GOP) organization are quite similar to that of the balanced battalion. Only normal artillery and engineer support must be added.

The advantages of the balanced battalion are also obvious in screening or delaying actions. The commander can maneuver to cover two, three, or even four enemy avenues of approach with little requirement for tailoring his companies. Hussar companies, reinforced with the battalion Anti-tank Platoon elements, are ideal for covering enemy high-speed, open approaches. Dragoon companies can handle most other foreseeable enemy avenues of approach with company resources.

Area Defense

In the area defense, the balanced battalion can cover the broad frontages required on, say, the North German plain while still maintaining a company-size reserve. The present school solution, as Captain Caine states, is a two-platoon reserve, with one normal strength and one reinforced company in the forward defensive area. The

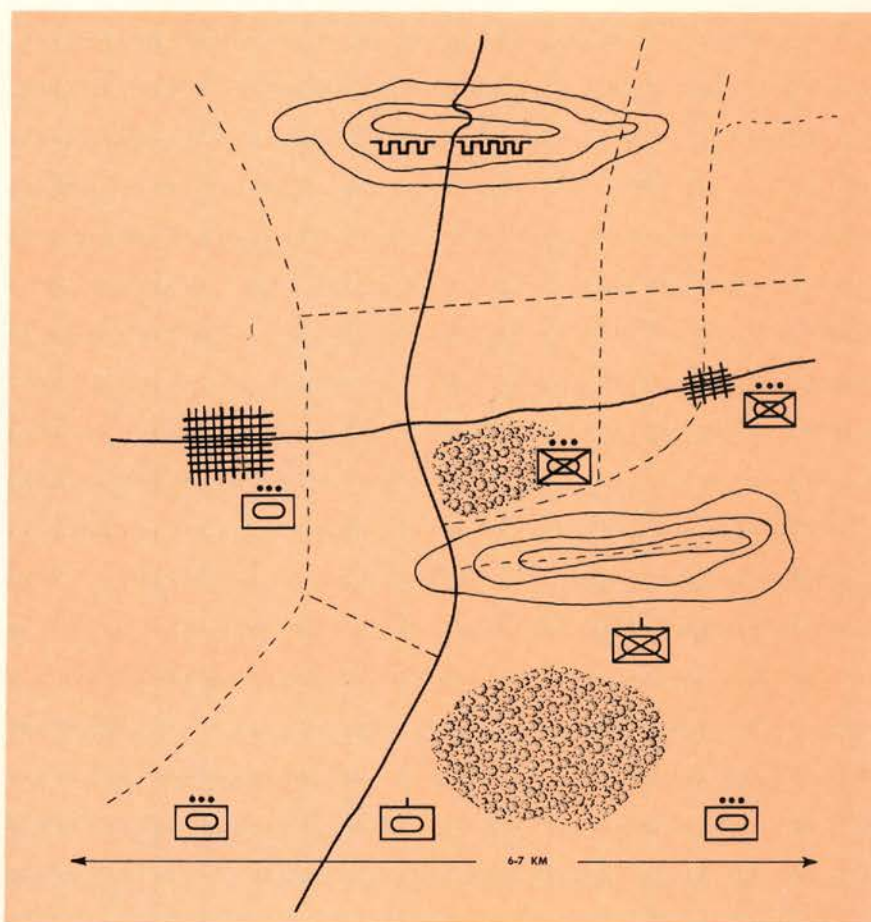


Figure 6. Movement to Combat

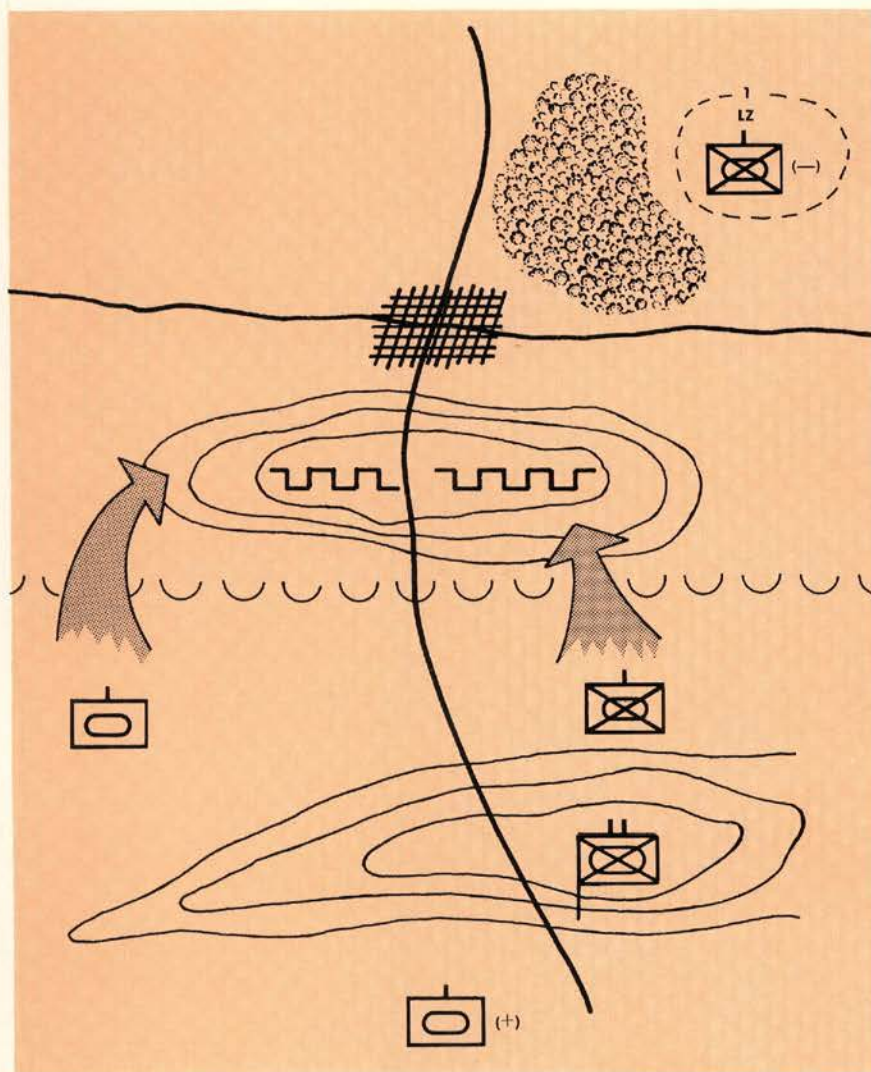


Figure 7. Classical assault with a difference — "two up, one back" and one on the LZ.

balanced battalion can put three companies forward and still have a complete one in reserve — a distinct advantage.

Advantages and Disadvantages

The advantages and disadvantages of the balanced battalion provide a useful summary for the first half of this article. There are two major points on the negative side. First, the balanced battalion is large in comparison to present TOE's. It has six instead of five companies. Some would argue that this will generate an unmanageable span of control problem. Perhaps, but many battalions in Vietnam operated with four line companies without great problem. Further, reinforced battalions are created as a matter of course

during operations. Should a commander adjust to a larger organization while in action, or should he have a larger unit from the start? A more important objection in terms of today's manpower and funding restraints is that only nine balanced battalions can be assigned to a division. The manpower for the present 10- or 11-battalion organizations will only support nine balanced battalions. These two points are important. Do the advantages outweigh them?

Most would agree that they do. The unit is combined and has balance. No single branch dominates. This situation should foster combined arms mentality and training, hence combined arms tactics. Whether or not separate infantry and armor branches are necessary is a moot point. Anyone assigned to a balanced combined arms battalion must have the important skills of each branch, and be able to think "combined arms."

Flexibility

The second major advantage of the balanced battalion is its *internal* flexibility. Attachment, detachment, and OPCON are minimized, along with their inherent problems. The battalion is adaptable, but in most cases (as shown above), this capability need not be exercised. Built-in flexibility responds to varying situations. The chaos

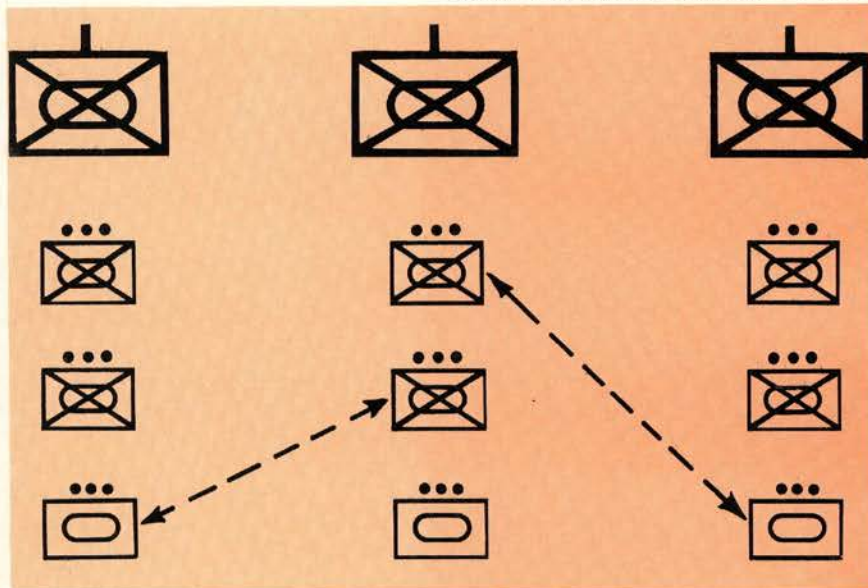


Figure 8A. Creating a pure battalion from a Dragoon battalion. Note particularly that a company normally infantry-heavy is now all tank.

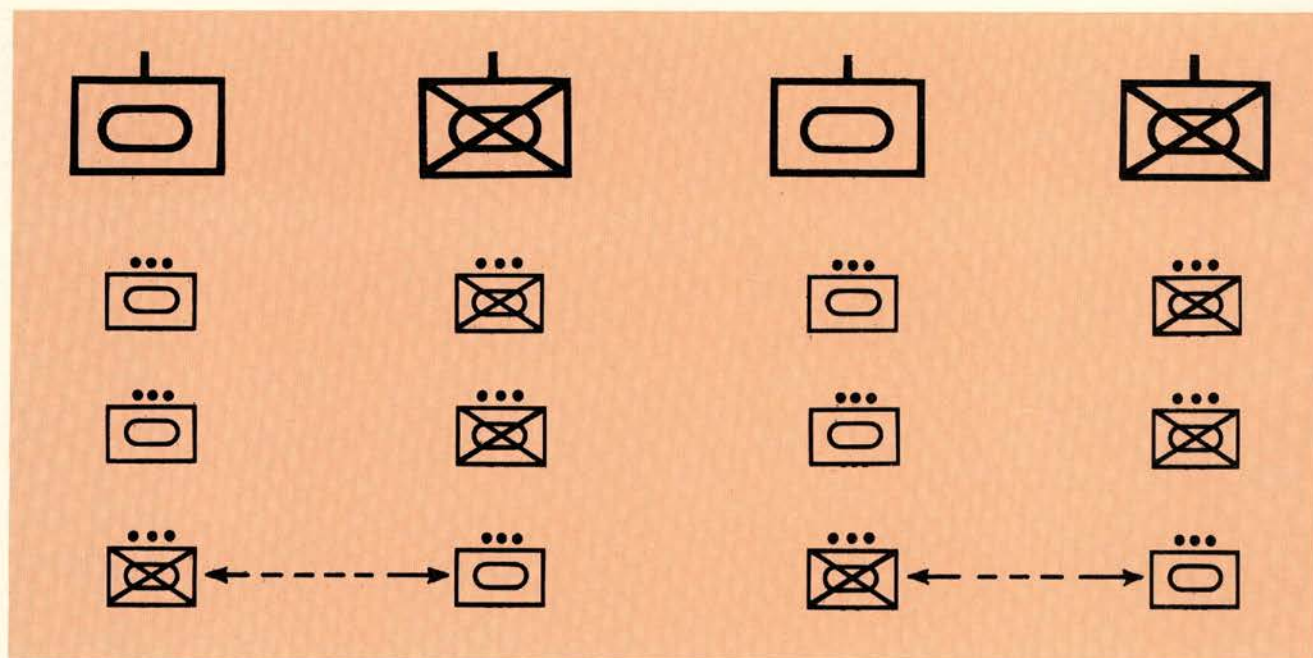


Figure 8B. Creating pure companies in a balanced battalion. Pure companies are created around a two platoon-base. Each unit retains its basic arms orientation.

of multiple cross attachment is almost eliminated.

A lesser, but important, advantage of the balanced battalion is its staying power. Midintensity or nuclear operations require units to face high attrition and still fight. Further, the open weave fabric of today's battlefield requires a unit to control large areas. The balanced battalion is capable of meeting these requirements, again without reinforcement.

Testing the Concept

That is the organization and theory. Does the idea work? Is the battalion viable? How should it be tested?

Forts Knox and Benning are the logical places to start looking for the answers to these questions. The 194th Armored and 197th Mechanized Brigades could be restructured to test the Hussar, Dragoon, and balanced battalion capabilities without harm to their other missions. The Infantry Center, logically, would house and train a Dragoon battalion and a balanced battalion. The Armor Center would have a balanced battalion and a Hussar battalion. The unit would train to battalion level at these two home posts. Obvious organizational problems could be expected to surface in this phase.

If the battalions prove viable in the

first phase, they should move into an extended maneuver phase, preferably in two or three environments. The maneuvers should be of the free, opposing forces type. Aggressor elements should be organized Soviet style as well as along current TOE lines. At least one organizational scheme (current TOE, Hussar, Dragoon, or balanced) should fall out as wanting during this phase.

The last phase is crucial. It should be a maneuver at brigade level with division command and support elements available. Proponents of each of the two finalists should be in command of their favorites. Activities should be as free from constraint as possible, with hit-kill indicators and other devices used to the maximum extent possible to provide realism. Obviously, the controller-umpire organization should be staffed by personnel specifically selected for this test. The selection, or rejection, of a combined arms organization for use in the future is an extremely important decision for which there must be both accurate data and a good feel for the situation. The testing phase is thus extremely critical.

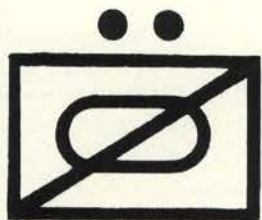
Summarizing, two proposals for combined arms battalions have been printed in the pages of *ARMOR*. There are obviously other solutions. Their proponents should air them here

or in other journals if they care to. Whatever happens, some combined arms organization should be tested. In the 35 years since the first blitzkrieg, we have learned a lot about combined arms tactics. It is high time we learned how to assemble a combined arms unit!



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short! over! lost! OR ... **TARGET** ⊕



by Captain Albert P. Leister, Jr.

What's Wrong With Scout Training?

The scout, the "eyes and ears" of the Army, the "eleven doughnut," or "eleven-zero" are but a few of the titles for the armored reconnaissance specialist (11D10) one encounters in the Army today. The name by which the 11D is referred to depends a great deal on how we as commanders and NCO's perceive the individual's proficiency. And, when we refer to an 11D as an "eleven doughnut," we are saying that the U.S. Army faces some serious challenges in the training of armored reconnaissance specialists. The purpose of this essay is not to fix the blame for training deficiencies, but to spark some long overdue attention to individual training during an era in which the emphasis lies in the evolution of new tactical doctrine and weapons systems that are mostly a fallout from the October War.

The first step in the decision/management problem-solving process is to define the problem. And the problem concerning the training of armored reconnaissance specialists revolves about the question of, *How proficient is the current AIT 11D10 graduate?* In order to get a feel for an answer to the question, I queried students of AOAC 1-75 who had held a previous assignment as an Armored Cavalry Troop Commander, or as Commander, Combat Support Company. The survey, which was conducted in the fall of 1974, included 24 captains with an average command time, prior to the AOAC course, of 16 months; 15 had commanded in CONUS, seven in Europe, and two in Korea. The questionnaire that was completed by the group asked a series of simple

questions concerning the proficiency of AIT graduates in various skills that are critical to MOS 11D.

The responses are summarized below:

% Responses in which The Scout was Perceived as Being Proficient	Skill
0	Map reading
50	Communications skills
59	Basic scouting skills (patrolling; recon techniques)
91	Driving
14	Calling fires/ Adjusting fires

If one were to take these responses out of context, they would be a damning indictment of our current

AIT for the individual scout.

However, before one condemns the AIT program, several things need to be explained. First, what is the stated mission of AIT? Second, what type of soldiers are the trainers receiving to train; and third, what is the current program of training? The answers to these questions may or may not reinforce the results of the author's survey; that is dependent upon your perception of what impact the answers have on AIT for 11D's.

How many of us have been guilty of receiving a new man fresh from AIT, watching his performance for a week or so, and then cursing the worthless AIT trainers for sending us an unqualified scout, gunner, etc.? If we all answered honestly, the roar of affirmative answers would drown out the negatives. Yet, how many commanders, platoon leaders, and NCO's — unless they were forced to do so — have sat

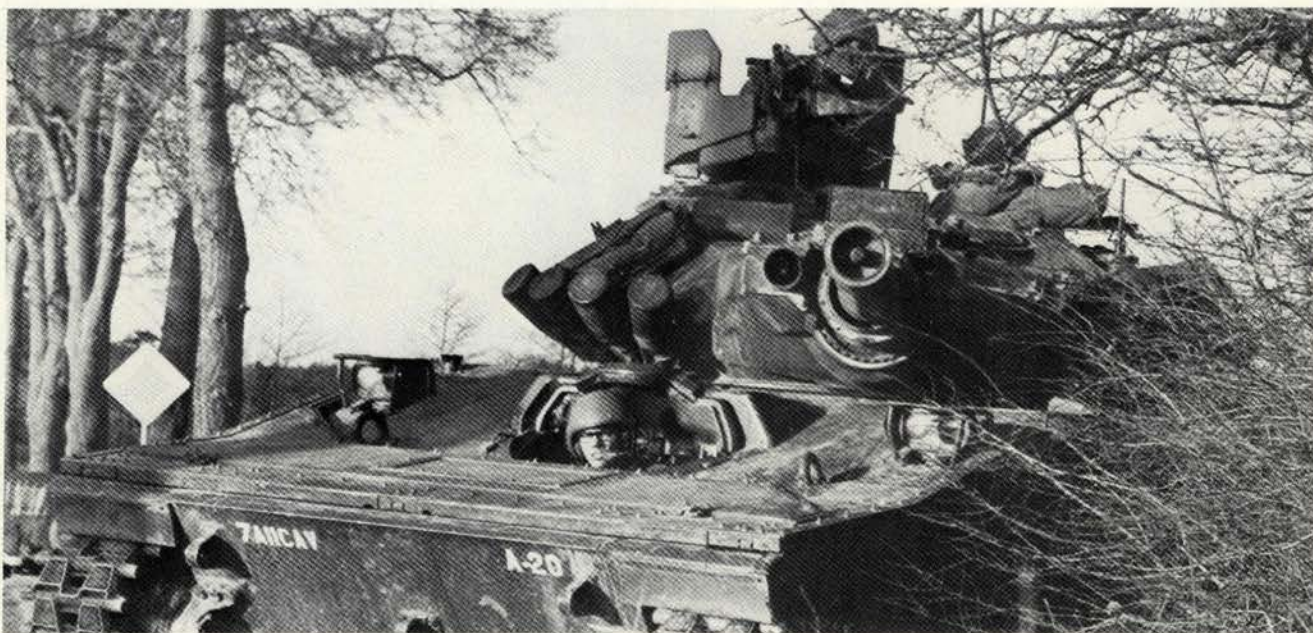
down and read ASUBJSCD 17-11D10, the document which guides the training of the 11D10? If one would read this document, he would find the following statement as the purpose of the ASUBJSCD and thence AIT in Sec I, para 2(b).

"Qualify a soldier in the grade of E-2 through E-4 to perform MOS duties after additional individual training at unit level."

Note the last seven words in this "mission" statement. If the man is not qualified in his MOS duties until "after

additional individual training at unit level," then why have we been so critical of the AIT program? A possible answer lies in the areas of guidance and the "real-world" situation. I have been unable to find any guidance as to what "additional training" is required. It is suspected that the "mission" of the AIT training program was written in order that the unit commander could decide on the extent of additional training on an individual basis. The AIT graduate deficient in map reading would receive remedial

instruction in that subject, while undergoing additional training in forward observer procedures. If this was the thought behind the current training program, then the "thinkers" need to examine the "real world" of the TOE units today. When the AIT graduate leaves the 5th Cavalry Squadron (AIT) at Fort Knox, where he has received 14-plus weeks of basic combat and advanced individual training, he leaves a world where the emphasis has been on his transition from the civilian sector into the combat arms. When he



Is the current 11D AIT graduate proficient at even the basic scouting skills?

arrives at his first unit, he has been trained to only a certain level of individual proficiency; but this "new" unit expects him to be fully trained and ready to fit into his crew. Now, the new scout enters a world where time is at a premium and the emphasis lies on whether or not the unit will pass the AGI, ARTEP, ATT, ORTT, gunnery, etc. These "events", plus the everyday demands of details, special duty, and on-duty high school classes, force the priority of "additional individual training" lower and lower down on the list of priorities. Thus, the unqualified scout arrives at a unit where the priority of fully qualifying the individual in his MOS is far down the ladder. This situation is viewed not as the fault of the troop commander, but as the effect of the environment in which units of the combat arms operate.

The previous comments have dealt with the trainer, and the recipient of the AIT graduate. Now, we need to focus some attention on the individual being trained. Just what is the profile of an 11D, and what is the selection process for this MOS? The criteria for entry into the 11D skill field are the same as those for the 11B (basic infantryman) with the exception that the 11D is required to have good night vision, and be capable of obtaining a military driver's license. The primary decision for selection of the scout at the time of entrance into the service, other than recruiting options, lies in the needs of the service. Those who have not selected one of the various enlistment options are designated as 11A, and are capable of being trained as 11D armored reconnaissance specialist, or 11E, tank crewman, depend-

ing on training spaces and the Army's needs.

Once a man is selected for AIT, the trainer receives an individual with a certain amount of previous civilian education. One can easily debate the validity of comparing education level, and the various levels of educational quality; however, some consideration must be given to the educational level as an indication of one's ability to reason logically, and as an indication to one's ability to succeed. A sample survey conducted by the Recruiting Retention Motivation Division, Fort Polk, Louisiana, in July 1974, as to the educational profile of the infantryman undergoing AIT was compared to a similar survey conducted by the author with the invaluable assistance of the 5th Cavalry Squadron (AIT) in late October 1974 (figure 1). The

comparison shows that the inputs to both AIT programs are relatively equal, with the 11D program receiving more personnel having a high school diploma, or GED equivalent, and the 11B program receiving more personnel having an educational level beyond the high school diploma/GED (15.5 vs. 7.4 percent). Those personnel who hold the view that the 11D's, by the nature of their mission, should be the best of the combat arms will have difficulty showing that this is the real case. In short, the 11D and 11B, based on educational levels, are relatively the same.

Educational Level	Percentage Attained	
	11B	11D
8th yr	2.4	2.6
9-10th yrs	18.4	15.2
11th yr	18.4	20.0
12th/GED	45.4	54.6
13th yr	10.1	4.8
14-15 yrs.	3.9	2.6
16/BS/BA	0.5	0.0
17th yr	1.0	0.0
Number surveyed	253	269

Figure 1

The goal of producing scouts who are the "best" of the combat arms can be achieved only through the training of the individual soldier. But when the problem of the ill-defined training mission mentioned previously is considered, we find that this goal is, to date, unachievable.

Given the average soldier, and the problem of an ill-defined training mission, one must examine other training problems inherent in AIT. The current AIT program of instruction encompasses 320 hours (8 training weeks of 5 training days each). Into these 320 hours are placed driving, qualification on the current ARSV (the AIT squadron currently trains on *M-151's* and *M-113's*), weapons firing (.50 caliber and *M-60* machineguns), land navigation, and other subjects outlined in ASUBJSCD 17-11D10. The possibility of producing a fully qualified 11D in 8 weeks is physically beyond the capability of the current AIT system. If one were to add current Army-wide training deficiencies such as CBR training, night training, terrain driving, individual electronic

"The basic problem concerning the performance of armored reconnaissance specialists . . . stems from inadequate training . . ."

warfare operations, and others, the entire system for training the cornerstone of our Army—the individual soldier—has some serious problems.

These problems will be further compounded by the introduction of new vehicular and weapons systems such as those currently under study by the ARSV Task Force. Some of the items under consideration include the new ARSV itself, the motorcycle, arming the scout with the *TOW* and *Dragon*, new CBR equipment, passive optic equipment, IR alarms, etc. As these items are added to the scout's inventory, decisions as to where the equipment will be introduced to the scout will have to be made. If the items are given to the AIT squadron to train on, then either the AIT program will have to be expanded thus increasing the amount of time the trainee is in the "pipeline," or replace subjects currently in the POI, and have these subjects fall onto the shoulder of the TOE unit commander for presentation during "additional individual training." The key point, however, is that the introduction of new equipment will only increase the severity of the problem.

The basic problem concerning the performance of armored reconnaissance specialists in my view, stems from inadequate training, due to the lack of proper guidance and the physical limitations of the program. This problem can only become more critical as the new ARSV and associated equipment enter the inventory.

I would be amiss if I did not have some possible solutions to offer. Those recommended are:

a. An in-depth examination of our training of the individual scout from the day of induction to the date he is considered fully qualified in his MOS. Topics that should be examined are: Do we want to change our selection of the 11D scout? In what skills is he to be trained while in AIT? And who is to train the scout on *what*?

b. Guidance to the unit commander as to what elusive "additional individual training" really entails for BCT/AIT graduates, and establishment of a monitoring of evaluation system to insure that the individual's proficiency is addressed properly.

c. A communication link between the AIT units and the receiving TOE units needs to be established. The establishment of a periodic survey of receiving units as to comments about the AIT (both good and bad) would be of invaluable assistance to the unit commander and the AIT squadron.

d. The establishment of some form of selection process for the 11D candidate by perhaps the combining of elements of 11B and 11D AIT; with the top 25 to 30 percent receiving additional AIT training to become 11D's and the remainder becoming 11B's.

In a time in which the Armor community is engrossed in a deep and thorough examination of its doctrine, tactics and equipment, another factor that needs a deep and thoughtful examination is that of the training of the scout. Because without sound and healthy trained "eyes and ears," no new doctrine, tactics, or equipment can save an excellent combat force from defeat.



CPT ALBERT P. LEISTER JR. was commissioned in 1969 upon graduation from the United States Military Academy. After graduation from the Armor Officer Basic and Ranger courses in 1969, he was assigned to the 5th Infantry Division at Fort Carson. Captain Leister served with the 4th Cavalry and the 17th Cavalry in Vietnam. He commanded Troop B, 5th Cavalry Squadron (AIT) USATC, Fort Knox. He is currently attending the Armor Officer Advanced Course.

Annual Armor Conference 86th Annual Meeting The U.S. Armor Association

Fort Knox 17-19 September 1975

Mark your calendars and start planning to attend the Annual Armor Conference and 86th Annual Meeting of the U.S. Armor Association. Registration and proxy forms have been mailed to all Armor Association members.

TUESDAY, 16 September 1975

All day Armor Association Registration — Country Club
(on post personnel)

WEDNESDAY, 17 September 1975

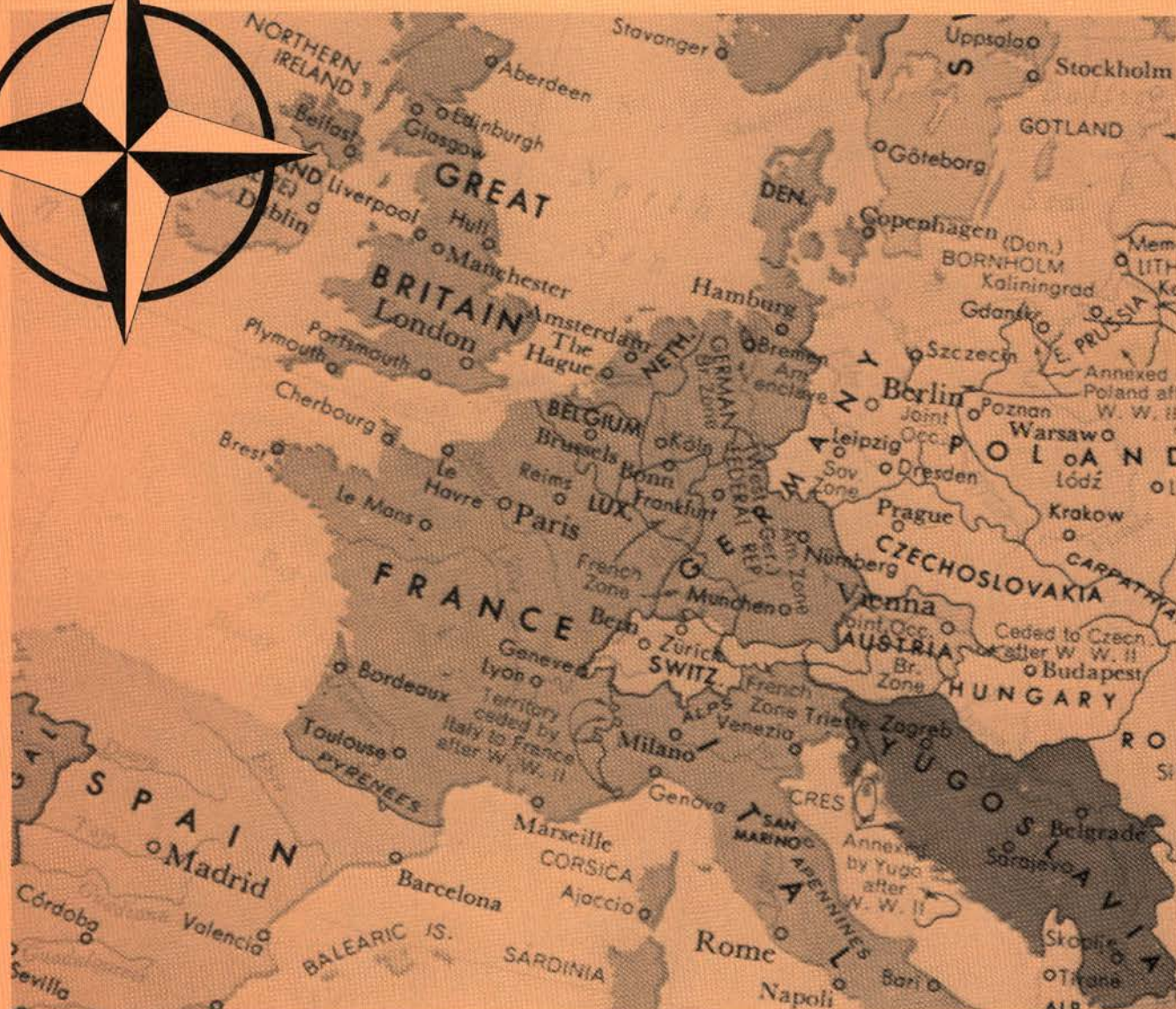
0800 - 1600 Arrival and Registration (Country Club)
1300 - 1600 Visit Patton Museum (Transportation from Country Club)
1830 - 2200 Cocktail Buffet in Garden, Quarters 1

THURSDAY, 18 September 1975

0800 - 0815 Honors Ceremony, Court of Honor, Brooks Field
0820 - 0830 Commanding General's Welcome, Waybur Theater
0830 - 0840 Response by President MG John K. Boles, Jr.,
 USA-Retired
0840 - 0910 Keynote Address by General Starry
0910 - 0940 ARSV Task Force Briefing
0940 - 0955 Coffee Break
0955 - 1040 XM-1 Briefing by General Baer
1040 - 1110 Armor and Engineer Board Briefing
1110 - 1200 New Tactics (Preview of Demonstration)
1200 - 1300 Business Meeting and election of new officers
1300 - 1400 Lunch — Brick Mess
1400 - 1430 Travel to USAARMS training site
1430 - 1700 REALTRAIN and New Tactics Demonstration
 School Brigade
 USAARMS
1700 - 1730 Travel to billet areas
1730 - 1830 Open
1830 Cocktails, Banquet — Brick Mess

FRIDAY, 19 September 1975

0800 - 0900 Briefing by General Baer — Waybur Theater (Selected
 Attendees)
0900 Executive Council Meeting (Working Breakfast)
 Cardinal Room, Brick Mess



BACKGROUND

A "shield," such as that carried by the brave warriors of old, is a defensive weapon used to block or parry an assailant's first blows. These same warriors found that an organized formation of "shields," called a phalanx, provided an outstanding defense for all. This "phalanx of shields" is indeed similar to the present day "shield of NATO" whose same purpose is to block or parry an aggressor's attack, permitting retaliation as required to maintain Western Europe.

The basic defense policy of the alliance is to avert war by making plain to the potential enemy that war will not pay. This policy, approved in January 1950 by the North Atlantic

**Lieutenant Colonel
Homer M. Ledbetter**

NATO in Western Europe

Council, has been the cornerstone of NATO's military planning. It led to the adoption of the strategy by which NATO peoples and territories would be protected against blackmail and invasion, and no major withdrawals would be acceptable. The abilities of the "NATO shield" to block and retaliate are equally essential to this credible deterrence.

As history has shown, it is the physical control of land that in the end is the measure of power—the "shields" of Central Europe are provided by seven determined nations. Together, these nations are providing in this "phalanx of shields" air forces needed for interception of enemy aircraft, air interdiction, strikes on enemy bases and close ground support; naval forces to preserve control of the vital sea areas, to protect lines of communications and to support air and land operations; and lastly, the mettle of these "shields," the *Land Forces of Central Europe*.

NECESSITY FOR THE SHIELD

The man in Moscow has persisted over the years in an uninterrupted policy of imperialism and expansion. Through his eyes looking toward the west, Europe appears as a peninsula to the Asian continent. It tapers toward the west with half of the 68,000-kilometer length under Russian domination and influence. The main bulk of the USSR lies to the east and is rich in mineral resources. It is in the west, compressed into a comparatively small area, that one of the world's most important regions lies. This area is strong in industrial production and scientific knowledge, but is divided into many countries which have formed a "grand phalanx of shields," the NATO Military Alliance. One can understand that such an objective is attractive to the man in Moscow. Here, everything the Kremlin so urgently needs is available in abundance. Today there appears to be a healthy movement toward detente and peaceful co-existence in Europe. However, it must be remembered that there has been no evidence of a reduction of Warsaw Pact military strength, in fact the combat power of the Pact is steadily growing.

Should this man in Moscow perceive

a lowered "NATO shield" he might calculate that the mere threat of his superior forces could subjugate Europe. A strong shield that is forward and ready is necessary to discourage the Soviet Union from trying to impose its will on the Alliance through aggression or the threat of an armed attack.

THE LAND THE SHIELD DEFENDS

The Central European Defense area consists of the countries of Belgium, the Netherlands, Luxemburg, and the Federal Republic of Germany. Although France has withdrawn from the integrated military command structure, she continues to belong to the Western Alliance, and is committed to help her allies by the NATO Treaty, as well as by the Western European Union Treaty.

This region extends from Northern Germany about 750 kilometers to the Austrian border in the south. The

tremely rugged. Behind this southern wall of mountains lies the flat, open country of the Donau River Valley. Thus, the plain of the north, the high, rolling ground in the center, and the flat, open country in the south are the approaches to the heartland that must be shielded—the heartbeat of Western Europe.

THE FORGING OF THE SHIELD

The Supreme Allied Commander in Europe's mission was and is today to maintain an effective deterrence by integrating the defense of Europe, to strengthen allied military forces in peacetime, and to plan for their most advantageous use in wartime.

To provide the framework for the shields, three major subordinate control commands were established—in the north, Allied Forces Northern Europe; in the south, Allied Forces Southern Europe; and in Central Europe to include U.S. forces,

"A strong shield that is forward and ready is necessary to discourage the Soviet Union from trying to impose its will on the Alliance through aggression or the threat of an armed attack."

most critical terrain lies east of the River Rhine within the Federal Republic of Germany. The loss of this terrain to an aggressor would mean the destruction of an effective NATO defense for the Alliance. This Central Region falls roughly into three different types of terrain. In the north, there is the comparatively flat open country of the North German Plain with few major terrain obstacles except for the River Weser. In the center of the region, where we find the bulk of the United States ground forces, there is close country that is hilly and predominately wooded. This country provides relatively good terrain to the defender, but the short approach to the Rhine offers little depth for maneuver. To the south, the terrain, especially along the Czechoslovakian border and the Demarcation Line, becomes ex-

Allied Forces Central Europe (AFCENT).

During a conflict, the allied forces in Central Europe under AFCENT's command include both ground and air forces. The ground forces initially consist of about 24 combat divisions and supporting units are provided by the United States and five other nations. The bulk of these forces, to include the U.S. V and VII Corps, are already stationed in Western Germany. The tactical air forces initially available consist of approximately 2,000 modern aircraft. To discharge its responsibilities during a conflict, Allied Forces Central Europe (AFCENT) is organized into four major subordinate commands—Northern Army Group (NORTHAG), Central Army Group (CENTAG), 2d Allied Tactical Air Force, and 4th Allied Tactical Air

Force. All of these headquarters are situated in the Federal Republic of Germany. NORTHAG's defense includes formations from the United Kingdom, Germany, Belgium, and the Netherlands. This multinational Army Group is supported by the 2d Allied Tactical Air Force composed of Bri-

detterence was provided meaning by primarily relying on the threat of massive United States bomber delivered nuclear weapons. The credibility of this massive retaliation doctrine as a deterrent against attack on NATO was based on the one hand on a near monopoly by the United States of

Central Europe's NATO forces will conduct (in the event of aggression) what is tactically referred to as a mobile defense. This tactical concept requires that combat, as well as logistics, forces be prepared at all times to conduct highly mobile and flexible operations throughout the Central Region. This concept dictates that maximum use be made of ground mobility as well as conventional and nuclear firepower as needed to halt any aggression against the Central Region. The mobile defense in Central Europe emphasizes well trained mechanized formations supported by tactical air forces, blocking and parrying an enemy penetration, while strong tank-heavy Corps and Army Group Reserves take advantage of mobility, close air support, and firepower, to attack and destroy any enemy formations attempting to penetrate the Forward Defense Area.

In summary, NATO's Central European defense can only be met by the provision of high quality equipment and weapons, high standards of training including multinational training, a high state of combat readiness, good logistics, and maintaining the visibility of NATO solidarity. Only by doing this can Central Europe's phalanx of shields be truly forward and ready.

"... as the Soviets introduced significant numbers of tactical nuclear weapons, the Alliance was forced to supplement their strategic nuclear capability with a tactical nuclear capability . . ."

tish, Netherlands, Belgian and German units. CENTAG includes German, Canadian, and our current American ground combat forces in Europe supported in the air by the 4th Allied Tactical Air Force with Canadian, American and German wings.

CONCEPT OF DEFENSE — SHIELDS FORWARD AND RAISED

When the Central European concept of defense, which includes our U.S. Forces, is considered, certain points should be emphasized. From the beginning, the defense policy of the Alliance was influenced by conflicting interests of the member nations. A collective defense for such a vast area posed enormous problems. In the late 1940's, it was hoped that a strong conventional land, air and sea force could be established to deter any aggression against the Alliance. This strong combined conventional force never materialized and the shield, when compared with the threat, was indeed weak. Many felt that, due to the massive strength of Soviet conventional forces, a rapid withdrawal to the French Pyrenees would be a possible solution. From this position, the Alliance could build up their forces and counterattack against the extended communist forces, thus liberating the occupied countries. Strategically speaking, this idea offered some merit, however this same idea offered little or no deterrence, and allowed for the Soviet conquest of over 100 million people. By the late 1940's, NATO's

nuclear weapons — no fear of retaliation; and on the other hand, by critically weak NATO ground forces — necessity to escalate. Later, as the Soviets introduced significant numbers of tactical nuclear weapons, the Alliance was forced to supplement their strategic nuclear capability with a tactical nuclear capability, a strategy which provided an even lower threshold for the use of nuclear weapons.

In the early 1960's, the fear that any aggression, no matter how limited, would lead to early and rapid escalation to strategic nuclear war, coupled with the Soviet Union's near parity with the United States in strategic nuclear missiles dictated a new concept. Thus evolved the concept of a forward and direct defense based on a credible military response at any level. The basic aim was to provide a continuum of deterrence including a requisite degree of military defense capability at any level of violence in the event deterrence failed.

The current Central Region concept of "forward defense" is guaranteed by a wide range of forces equipped with a well balanced mix of conventional weapons and tactical as well as strategic nuclear weapons. The cornerstone of this concept, often referred to as "flexible response," is twofold — first the Alliance must be visibly resolved to meet the crisis at hand and secondly the enemy must be convinced of Central Europe's readiness to shield itself with whatever force is necessary, to include escalation if required to a nuclear conflict.

To give meaning to this concept,



LTC HOMER M. LEDBETTER has commanded two cavalry troops and advised a Vietnamese cavalry troop. He has served as an operations officer at both the MACV Tactical Operations Center and at Allied Forces, Central Europe, NATO. Colonel Ledbetter is currently assigned as Deputy Inspector General, III Corps and Fort Hood.

Training Support Update

The correspondence subcourses listed below are now available. Individuals may obtain them by mailing a completed DA form 145 to the Armor School, ATTN: ATSB-TS-CC, Fort Knox, KY. 40121.

SC 131 — Drug Abuse. (NEW)

Types of drugs commonly used, based on the physical symptoms of user; essential elements of a drug abuse education program and procedures for implementing a rehabilitation program; the legal considerations regarding drug abuse incidents.

SC 321 — Communication Planning. (NEW)

Communication-Electronics (C-E) planning process, including the capabilities and limitations of equipment, communication systems characteristics, requirements and responsibilities; criteria for selection of a command post site to support the C-E activities of a battalion or brigade headquarters; functions and responsibilities of battalion and brigade C-E personnel; and support provided by the division Signal battalion.

SC 421 — Communication Security and Communication-Electronics Orders. (REV)

Purpose of communication security; components of COMSEC; platoon leader's responsibility for physical, cryptographic, and transmission security; purpose and content of a CEOI extract, paragraph 5 of the operations order, the C-E annex to the SOP, and the use of CEOI extract items.

SC 424 — Antennas and Field Expedients for Antennas. (REV)

Antenna siting considerations; advantages and disadvantages of using selected FM antennas; procedures for construction, installation, and use of expedient antennas; and the basic principles of radio transmission and reception.

SC 425 — Electromagnetic Interference (EMI). (REV)

Sources and effects of EMI, recognition and reporting procedures, and preventive and remedial measures.

SC 529 — Communications I. (REV)

Introduction to Communications-Electronics; communications security and radiotelephone procedures; communication-electronics orders; armor command radios and associated equipment; remote control and retransmission equipment; Radio Sets AN/PRC-77, AN/VRC-64, and AN/GRC-160; and antennas and field expedients for antennas.

SC 536 — Map Supplements Analysis of Terrain. (REV)

Characteristics of 1:250,000 and 1:50,000 scale maps; inspection of relief, drainage, and man-made objects on 1:250,000 scale maps to determine characteristics; terrain factors on large scale airphotos; and use of the pictomap as a map supplement.

DISCONTINUED PUBLICATION

ST 17-15-1, Armor Leaders Guide, will no longer be published by the Armor School. Much of the information contained in the text will be incorporated in the following new DA training circulars:

- TC 17-12-3 Battlefield Gunnery Techniques for Tanks
- TC 17-15-2 Maintenance Tips for the Tank Platoon Leader
- TC 17-15-3 Tank Platoon Organization & Techniques of Movement
- TC 17-36-2 Armored Cavalry Platoon Organization & Techniques of Movement
- TC 17-199 Tank Platoon Handbook (not yet printed)

NEW FILM

A new Armor School television film, ARS 44-75, *Movement Techniques*, is highly recommended to commanders of Armor, Mechanized Infantry, and supporting Artillery units, down to vehicle level. This 17-minute film, narrated by MG Donn A. Starry, relates how, where, and why the movement techniques of Traveling, Traveling Overwatch, and Bounding Overwatch, should be used. It is available in both color and black and white through the TASO TV interchange program.

M-48A1 TELEVISION TAPES

The following television training tapes for the M-48A1 tank have been developed by the Armor School. They are presently being distributed by the Training Aids Management Agency (TAMA) to all Reserve and National Guard battalions and squadrons equipped with that tank. In addition, these tapes are being provided to the TASO's which support M-48A1 equipped units.

NUMBER	TITLE	RUN TIME
ARS 10-75	Familiarization with Turret Fire Control—M-48A1	12:18
ARS 13-75	Turret Power Operation—M-48A1	11:47
ARS 14-75	Mounting and Boresighting the M-37 Coaxial Machinegun	9:30
ARS 15-75	Check and Adjust Track Tension—M-48A1	7:55
ARS 16-75	Before Operations Checks and Services on the M-48A1 Engine Compartment	7:55
ARS 17-75	Placing Engine Compartment Heater into Operation—M-48A1	8:41
ARS 18-75	Cold Weather Starting—M-48A1	8:20
ARS 27-75	The Caliber .50 M-2 HBTT Machinegun and the M-1 Cupola	15:56
ARS 28-75	M-48A1 Target Engagement	15:28
ARS 29-75	Stereoscopic Range Finder Operation	12:08
ARS 34-75	Boresighting—M-48A1	15:12
ARS 35-75	Zeroing—M-48A1	11:23
ARS 40-75	M-48A1 Misfire Procedures	10:28
ARS 42-75	The M-48 on the Modern Battlefield	30:29

ADDITIONAL ARMOR TEC LESSONS

The following additional Armor TEC lessons are in the final stages of production. It is anticipated that all will be in the hands of appropriate units by the time this article is published, or shortly thereafter.

020-171-1631-F	Performing Prefire Procedures, M-551
020-171-1621-F	Making the Turret Operational, M-551
020-171-1623-F	Searchlight Operation, M-551
020-171-1624-F	Cupola Operation, M-551
020-171-5364-F	M-60/M-60A1/M-60A3 Target Engagement: Machinegun Engagements
020-171-5343-F	Operation of the Xenon Searchlight, M-60/M-60A1
020-171-1000-F	Identification and Employment of Ammunition for the M-551; M-60A2
020-171-1632-F	Boresighting and Aligning Weapons and Sights, M-551 <i>ARAAV</i>
020-171-1633-F	Zeroing Sights and Weapons M-551 <i>ARAAV</i>

NEW TV TAPES

The following TV tape programs have recently been completed at Fort Knox. They are available for either ¾-inch cassette players or the 2-inch Sony Rover, and may be obtained through your local TASO, or by calling directly to the Fort Knox TV Division, AUTOVON 464-6745/3725.

NUMBER	TITLE	RUN TIME
ARS-8-75	PM Indicators on Small Tactical Radios and Antennas	19:24
ARS-9-75	PM Indicators on Hi-Powered Single Sideband AM Radios and Wire Commo Equipment	19:24
ARS-27-75	M-2 HBTT, Cal .50 HG, Operations	15:56
ARS-28-75	Target Engagement	15:20
ARS-29-75	M-13 Stereo Range Finder	16:00
ARS-38-75	Maintenance Inspection Evaluation	15:33
ARS-43-75	How to Complete Weapon Record Data, DA Form 2408-4	05:40
BH-1-75	Enlisted MOS Structure	10:15
ARS-44-75	Movement Techniques	17:00

DID YOU KNOW?

How the Fourragere and Aiguillette Came To Be

These are horribly un-American words for common items of military ornamentation worn in all armies. You have undoubtedly seen them—metal-tipped, colored cords worn around the shoulder. The *aiguillette* is the mark of an aide de camp. The *fourragere* is awarded as a unit citation. There is some disagreement as to whether the *fourragere* is a separate item of ornamentation, or merely a form of *aiguillette*.

Let me say right now that nobody really knows how these items originated. The distinguished military historian Fortescue declines even to make a guess.

Here are some of the prevalent theories:

The *aiguillette*, as the badge of an aide, has been traced to the picket lines carried by squires to tie out the knights' horses; to the metal-tipped thongs used by the squires to lace knights into the early types of armor; to the pencil carried on a string by aides ("adjutants") for writing down orders. What all these theories have in common is that they account for the metal tip and are associated with aides or adjutants.

Perhaps there is a clue in the word itself. *Aiguille* is French for "needle." Modern French meanings of *aiguillette* include "metal-tipped thong." If we can infer a meaning of "needle" rather than "nail, pencil tip," etc., from the word itself, then we arrive at one set of conclusions. Perhaps the item evolved from the needle carried by musketeers for cleaning out the touch holes of their weapons. If so, what is its association with aides?

The *fourragere*, as a unit citation, has been traced by some to a hangman's rope and a nail! One story is that a unit (Duke of Alva's Flemings?) was threatened with mass hanging if they did not start doing better in battle. They exhibited their self-confidence by providing the equipment. Naturally, their next operation was such a success that the ropes were retained as a "unit citation."

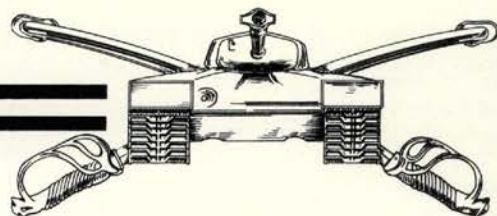
Another yarn is that a general (Cromwell?) threatened to hang any member of a particular (Irish?) regiment he ever captured. The regiment showed its (Irish?) contempt by providing the equipment.

Still another story (and we might as well have all of them) comes from the Franco-Prussian War (1870). The Paris jails were cleaned out to form provisional units for the defense of the city. One group wrapped hangman's ropes on their shoulders as a sort of improvised insignia. They performed so well that they were kept in service after the war and permitted to keep their "insignia."

Again, the word itself furnishes a clue. *Fourragere* is still used in French to describe "fodder" or "forage." Parties sent out foraging might logically have carried ropes around their shoulders for tying up bundles of forage.

Having exhausted the curiosity of most readers as to the origin of words they had probably never heard anyhow, we will now leave the subject.

From Military Customs and Traditions
by Mark M. Boatner III, Copyright 1958
David McKay Company, Inc.



With this issue, From the Armor Branch Chief is replaced by OPD-Armor. The goal of the Officer Personnel Directorate continues to be diligent service to the commissioned officer. The careers of Armor officers will continue to be managed by Armor officers. OPD-Armor will appear regularly in ARMOR to keep you informed of important career matters.

OPD REORGANIZATION

The reorganization within OPD has been completed with seemingly very little if any disruption in our efforts to serve you, the Armor officer. Certainly there was a note of sadness as the various artifacts, which had for so long been displayed within the branch, were either sent to the Patton Museum or divided among the new divisions with the majority going to the new Armor Branch.

Yes, there is still an Armor Branch very well designed and staffed to serve the company grade Armor officers, and totally dedicated to doing just that. Although Armor Branch no longer manages the careers of majors and lieutenant colonels, there are still Armor officers within these divisions to insure that the same personal service for Armor field grade officers continues.

Although the reorganization went very smoothly, we did encounter a problem with the initial assignment of telephone numbers, which resulted in several erroneous listings. However, it appeared, based on the telephone traffic received, that most officers in true cavalry fashion, were able to quickly ascertain the correct numbers. But for those who did not have occasion to call, we thought it a good idea to provide the correct telephone numbers along with the names of those persons who you may wish to contact in the future.

ARMOR BRANCH NUMBERS

		AUTOVON
Chief	LTC John M. Toolson, Jr.	221-9696
CPT Assignments	MAJ Jon D. Collins	221-9444
LT Assignments	MAJ Thomas Montgomery	221-7849
New Accessions	Mr. Leo L. Leal	221-9658
Aviator Assignments	MAJ Howard P. Born	221-9444
*Civil Schools	CPT Gregory Sharp	221-9666
*Flight School	Ms. Jenny Wright	221-7849
*Personnel Actions	LTC Frederic H. Stubbs	221-9658
Release from Active Duty	Mrs. Jo Kirby	221-7818
OER Appeals (LTs)		221-7818
(CPTs)		221-7820
*Serves all Combat Arms company grade officers.		221-7820
Chief, Combat Arms Division, COL Elliott P. Sydnor, Jr.		221-7819
		221-0701
		221-0701
		221-7813

NOTES FROM MAJORS AND LT COLONELS DIVISIONS

Whom do I call at MILPERCEN when I need assistance? Perhaps names and phone numbers are the most important information we can print here to bring you up to date now that we've reorganized. They're listed below. *When do I call the Armor Assignment Officer as opposed to my alternate specialty assignment officer?* When you are talking about an Armor assignment or what general information. *Who takes care of my record (Career Management Individual File)?* The Armor assignment officer has it and can answer your questions.

He'll also keep an eye on your overall career development in both specialties. Now here are those numbers:

KEY LT COLONEL'S DIVISION NUMBERS

Specialty	Assignment Officer	Autovon
Armor (12)	LTC Pat Quinlan	221-9549
Operations & Force Development (54)	LTC Claude Franandez	221-9529
Research & Development (51)	LTC Don Tillar	
Engineer (21)	LTC Ken Jensen	221-9789
Atomic Energy (52)	LTC Hank Covington	221-9799
ORSA (49)		
Communications-Electronics (25, 26, 27, 28)	LTC Jerry Lambo	221-9799
ADP (53)		
C-E Materiel Management (72)		
Tactical-Strategic Intell (35)		
Counterintell (36)	LTC Bill Fritts	221-0423
Cryptology (37)		
Law Enforcement (31)		
Foreign Area Officer (48)	LTC Gene Cromartie	221-0423
Personnel Management (41)		
Personnel Admin. (42)	LTC Kirk Williams	221-0424
Club Management (43)		
Education (47)	Mrs. Inez Belcher	221-0424
Information (46)		
Finance (44)		
Comptroller (45)	LTC Fred Schrader	221-0424
Logistics Specialties (81, 82, 83, 92, 93, 97)	LTC Bob Barrett	221-7898
(71, 86, 87, 88, 95)	LTC John Stanford	221-7898
(73, 74, 75, 76, 77, 91)	LTC John Ramsden	221-7898
Personnel Actions	Mr. Frank Knight	221-7893
Military & Civilian Schooling	LTC Paul Gleave	221-0752
(Division Chief — COL George Hoffmaster — 221-7890)		

KEY MAJOR'S DIVISION NUMBERS

Specialty	Assignment Officer	Autovon
Armor (12)	MAJ Lee Fulmer	221-0686
ORSA (49)		
Engineer (21)	MAJ Ted Stroup	221-8109
Atomic Energy (52)		
Combat Communications- Electronics (25)	MAJ Jim Harrison	221-8109
Audio-Visual Instructional Tech (28)		
Tactical-Strategic Intelligence (35)	MAJ Jerry Campbell	221-8108
Counterintelligence (36)		
Cryptology (37)		
Personnel Management (41)	MAJ Ray Andrae	221-8121
Club Management (43)		
Education (47)	MAJ Jim Dillard	221-8122
Comptroller (45)		
Law Enforcement (31)		
Information (46)	MAJ Grier Campbell	221-8107
ADPS (53)		
FAO (48)	LTC Glenn Yarborough	221-0686
OPS & Force Development (54)		
R & D (51)	MAJ Bob Lander	221-0687
Aviation Material Management (71)	MAJ T. Irby	221-8119
Maintenance Management (91)		
Tank & Ground Material Management (77)	MAJ Tom Gill	221-8113
Supply Management (92)	MAJ Dick Beale	221-8120
Procurement (97)		
Personnel Actions	MAJ Sam Thompson	221-8113
Military and Civilian Schooling	LTC Bill Warnock	221-8105
Chief, Majors Division, COL John R. Byers. Autovon 221-8117		

Vietnam Refugee Information

Soldiers seeking information about Vietnamese refugees now have a central Army point of contact. An Army element has been set up in the special Joint Refugee Information Clearing Office to provide information on the location of individual refugees — refugee sponsorship — and the names of volunteer agencies working in refugee relocation.

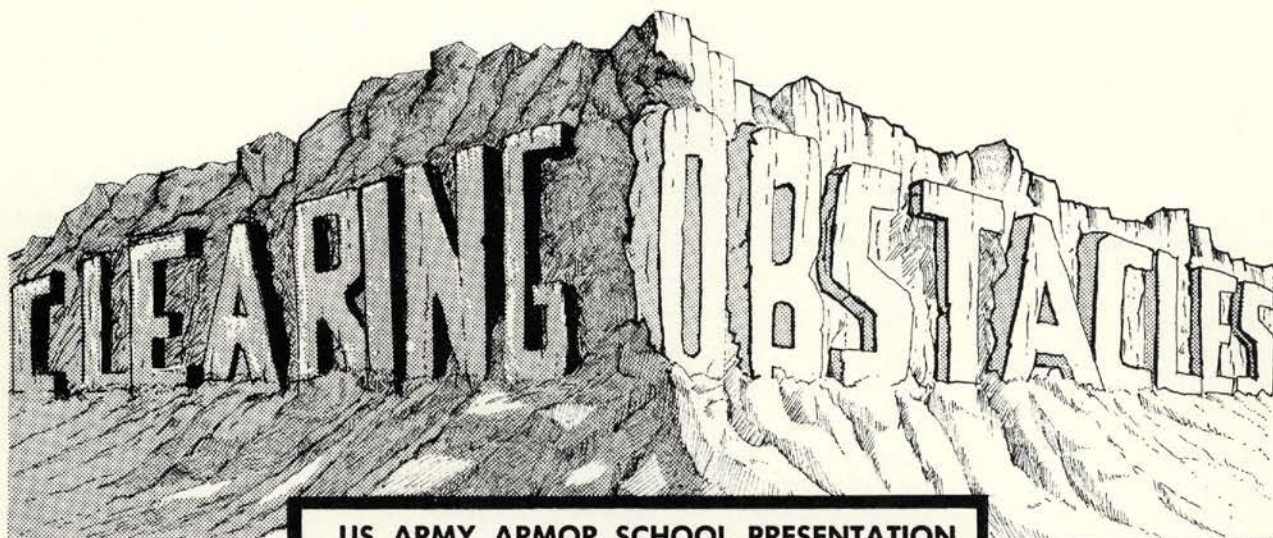
Many of the more than 100,000 refugees are former members of the Army of the Republic of Vietnam. Army personnel — active, reserve or retired — and veterans who wish to find out

if a former comrade-in-arms has left South Vietnam or if he needs a sponsor may contact the Army element in the information clearing office.

Since the decision to sponsor Vietnamese refugees is voluntary and personal, communications between a person or group and the information clearing office should be direct — not through command channels.

The Army element can be contacted by calling Autovon 227-5190/1/2 or 5110; commercial (AC) 202-697-5190/1/2 or 5110.

HOW WOULD YOU DO IT?



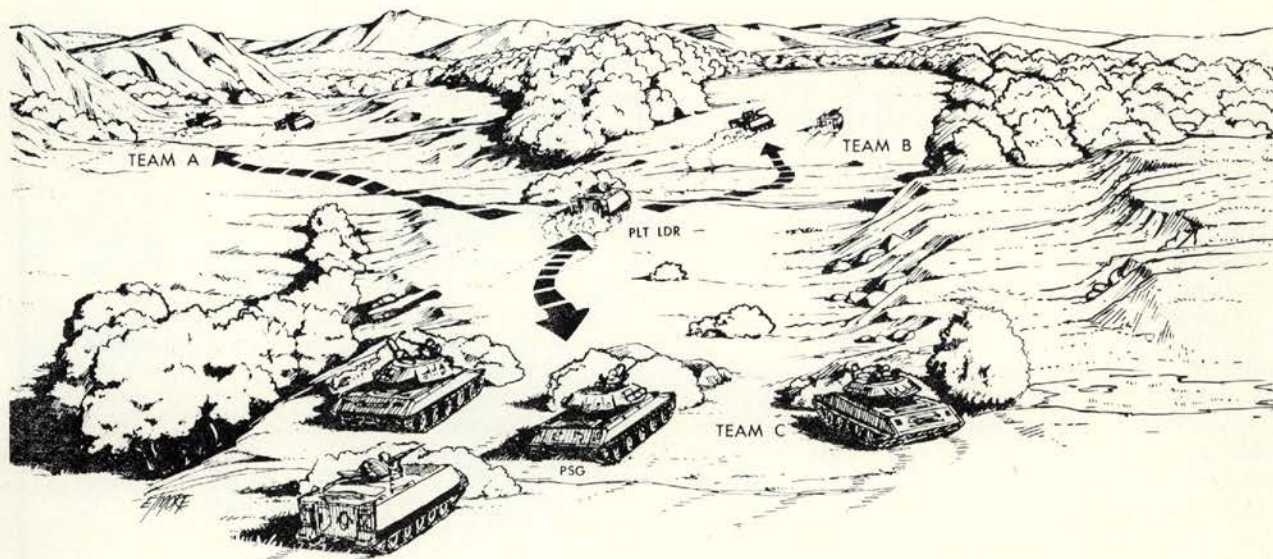
CLEARING OBSTACLES

Training Circular 17-36-2, "Armored Cavalry Platoon Organization and Techniques of Movement," June 1975, describes the latest techniques of tactical employment for the armored cavalry platoon and how it moves on the battlefield. This TC shows how the platoon leader, regardless of TOE, can organize his platoon into two or three teams, depending on the mission, enemy, terrain, vehicle availability, and available leaders.

SITUATION

You are 1st Platoon Leader, and have been ordered to reconnoiter Route Blue (see map). The support squads are consolidated at troop level for this operation. Your platoon is organized into three teams with light armor consolidated, as shown. (This is a conventional CONUS organization.)

Team Alpha—2 scout vehicles
Team Bravo—2 scout vehicles
Team Charlie—3 M551's and the infantry squad



Author: CPT W. R. Wilson, Jr.

Illustrator: Steve Chappell

During the past twelve hours, scattered contact has been made with squad-size enemy forces. Intelligence reports indicate that the enemy is conducting a delay.

The troop commander has informed you that an aeroscout reported the bridge at coordinates 857952 intact; however, it contains obstructions and appears to be wired for demolitions. No enemy elements were observed in the immediate vicinity. Team Charlie is now in the vicinity of coordinates 848942. You have moved forward to join team Bravo at coordinates 854949. Team Alpha is currently located at coordinates 848952.

PROBLEM

You have been directed to clear the bridge and continue the route reconnaissance mission. How do you direct your platoon, and how will each team move?



SOLUTION

Your instructions to the team leaders would go like this:

DUTY POSITION	CALL SIGNS
Platoon Leader	DAWN 16
Platoon Sergeant (Charlie Team Leader)	DAWN 15
Scout Squad Leader (Alpha Team Leader)	DAWN 11
Scout Squad Leader (Bravo Team Leader)	DAWN 13
Rifle Squad	DAWN 18

PLATOON LEADER to CHARLIE TEAM

LEADER: ----- DAWN 15—THIS IS DAWN 16—MOVE YOUR ELEMENT TO A POSITION 200 METERS WEST OF CP 51 TO PROVIDE OVERWATCH—LET ME KNOW WHEN YOU ARE IN POSITION—OUT.

Once overwatch is established, you can move the rest of the platoon up.

PLATOON LEADER to ALPHA TEAM

LEADER: ----- DAWN 11—THIS IS DAWN 16—MOVE YOUR ELEMENT ACROSS THE CREEK—RECON AROUND THE LAKE TO THE HIGH GROUND NEAR CP 21 AND SET UP AN OP—OUT.

PLATOON LEADER to BRAVO TEAM

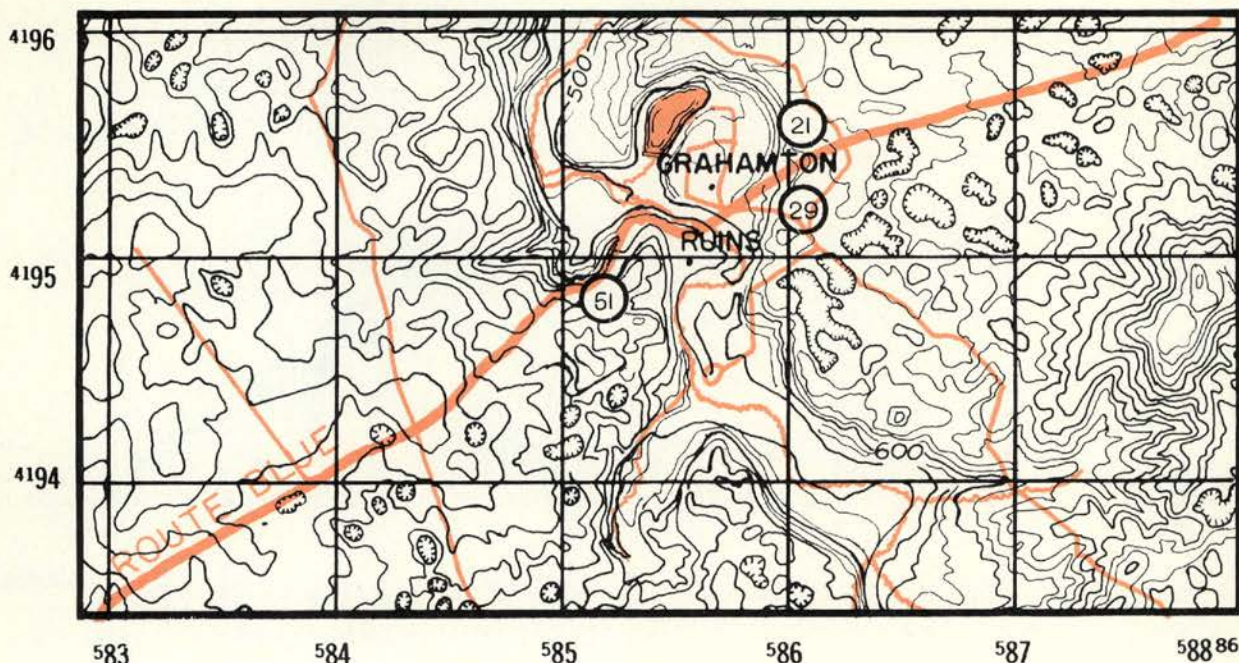
LEADER: ----- DAWN 13—THIS IS DAWN 16—MOVE YOUR ELEMENT ACROSS THE CREEK TO THE HIGH GROUND NEAR CP 29 AND SET UP AN OP—OUT.

Moving across Otter Creek, the scouts check for alternate fording or AVLB sites and report at their earliest opportunity. After the scouts are in position, you direct Charlie Team Leader to have the rifle squad clear obstacles:

PLATOON LEADER to CHARLIE TEAM

LEADER: ----- DAWN 15—THIS IS DAWN 16—MOVE DAWN 18 (rifle squad) TO THE BRIDGE AND CHECK IT FOR DEMOLITIONS—LET ME KNOW WHEN IT IS CLEARED—OUT.

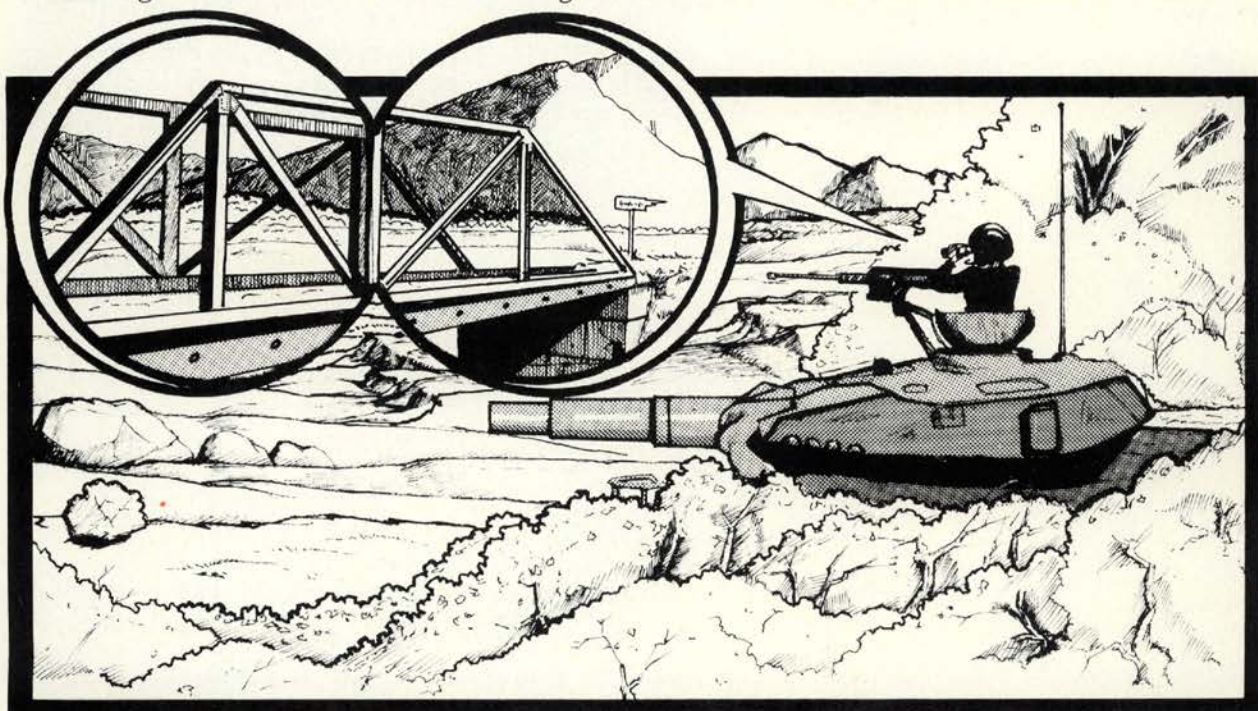
After obstacles have been cleared, the rifle squad reports to Charlie Team Leader, who in turn reports to you. You report to the troop commander.



DISCUSSION

Conduct visual reconnaissance for enemy positions before lead elements cross a bridge or negotiate any type of obstacle. All dominating key terrain forward of the bridge must be reconnoitered for enemy positions to provide security. The overwatching light armor section covers the movement of the scout elements and the rifle squad. When mines, booby traps, or ambushes are suspected, patrols reconnoiter the approaches to the obstacle area. Bridge reconnaissance includes checking the

bridge—above and below—for mines, boobytraps, demolitions, or weakened construction. Any demolitions are removed or neutralized. Once obstacles are cleared, the remainder of the platoon passes over the bridge. In case the bridge cannot be used, scouts should reconnoiter for possible fording sites or AVLB sites—bearing in mind the water-crossing capabilities of the unit they serve. Any fording sites must be reconnoitered and cleared of underwater obstacles and demolitions before use. **USE THE TERRAIN AND MAKE IT WORK FOR YOU.**



THE VP-90 LIGHT INFANTRY SUPPORT VEHICLE

The *VP-90*, a new lightweight, tracked vehicle for infantry combat, reconnaissance, and observation missions, is now in limited production by the Lohr Company of Strasbourg, France. First shown at the 1971 French Army Materiel Exhibit, the *VP-90* combines high road speeds and all-terrain capability with an extremely low silhouette.

The rear-mounted, liquid-cooled gasoline engine of the *VP-90* is from 60 to 120 hp, depending on the terrain and the role it is intended to fulfill. A four-speed, semi-automatic gearbox, a differential incorporating self-ventilated disc brakes, and rear-end drive sprockets transmit power to the tracks. The tracks consist of endless rubber belts, which are reinforced internally with synthetic fabric. Five light alloy road wheels on each side are linked to an extremely flexible suspension system, utilizing rubber rings. The vehicle's nose can be raised or lowered

Armed with a 20-mm light gun and towing a 120-mm mortar, the *VP90* can carry a maximum of 5 troops (including the driver), or one driver plus 600 kilograms of equipment. Its

(9 or 4 degrees respectively), due to an electrical levelling device linked to the suspension system. This improves obstacle crossing capability and allows weapons mounted on the hull to be aimed in elevation. Steering and braking are hydraulically controlled with mechanical backup. A certain amount of crew protection is provided by ribbed steel sheets in the hull of the *VP-90* and an armored front end.

A variety of armament, ranging from light machine guns to 75-mm cannon and 81-mm mortars, can be fitted to the *VP-90*.

The *VP-90* can be used for a number of different roles; for example, as a troop transport vehicle, supply vehicle, weapon carrier, ambulance, or a command car. Combining a maximum road speed of 85 km/h with a turning radius of only 2.5 meters and low footprint pressure, the *VP-90* is able to accompany or precede armored formations on reconnaissance or support missions. Its low weight when fully loaded makes it suitable for heliborne commando-type operations.

overall height of 1.05 meters offers a low silhouette, providing the vehicle with a certain measure of protection against nuclear blast and radiation.



DEMOLITION FIRING DEVICES

New demolition firing devices recently tested by the U.S. Army Artic Test Center, Fort Greely, AK, will allow demolitions to be exploded reliably and safely from distances ranging from 1,000 meters to 20 miles.

The *XM-122* demolitions firing device is capable of firing electrical blasting caps through the use of radio transmissions. The battery-powered system consists of a radio transmitter and any number of sensors (receivers). The lightweight transmitter has a telescoping antenna which, when collapsed, serves as a carrying handle.

The transmitter also has six push-type code-indicator switches which are set to the individual codes of each sensor. This prevents the sensors from being activated by another transmitter operating on the same frequency. Each sensor may be wired with up to five explosive charges, and fired from up to 20 miles away. The sensor is powered by one *BA30* battery and uses a 6- to 10-foot wire antenna.

The *XM-124* demolitions firing device is a miniaturized power source which is capable of detonating up to 20 electrical caps at one time using 1,000 feet of either firing wire or standard communication wire. This device is capable of performing both as a power source, to fire demolitions, and as a firing circuit continuity tester. The 14-ounce device is simple to operate because it provides the operator visual indication of circuit continuity through a neon lamp, and it has a positive safety system to prevent accidental firing.

In addition, the device is a sealed unit that can be discarded after approximately 200 firings. If adopted, the *XM-124* would be issued to unconventional warfare forces, to long-range patrols, and other specialized forces.

GUARD-RESERVE TO GET M-48A5's

Army National Guard and Army Reserve units will be getting the bulk of about 1,200 *M-48* series tanks which are being converted to *M-48A5*'s — mounting 105-mm guns and driven by diesel engines. Delivery of the *M-48A5*'s is to begin in October and expected to be completed by October 1978.

The *M-48A5*'s firepower, mobility and armor protection are comparable to that of the *M-60* tank. Upgrading *M-48* tanks offers an immediately responsive

means of meeting current combat requirements.

The *M-48* conversion program also represents a big savings in production costs. Upgrading the *M-48* series of tanks can be done for about a fourth to half of what it costs for a new *M-60A1* tank. Furthermore, the *M48A5* and the *M-60* tanks both mount the same engines, guns, fire control system and other parts.

Similarly modified *M-48*'s proved themselves in the October 1973 Middle East War. The Israeli Army is now expanding modification of its *M-48* tank fleet based on its outstanding combat performance.

FREE TRAINING AIDS AVAILABLE

An opportunity is now given Active Army, Reserve and National Guard units to obtain such things as new training devices, good blackboards, and attractive lecterns at no cost. This has all come about because of an arrangement recently concluded by the United States Disciplinary Barracks and the Training Aids Services Office at Fort Leavenworth, KS.

Under the arrangement, units desiring training devices and instructional aids should contact the TASO which is responsible for providing their support and tell that office what they need. The request will then be forwarded to the TASO at Fort Leavenworth, where it will be evaluated to determine if the work can be done and, if so, it is scheduled into the program. When the work has been completed, the finished product may be shipped to either the requesting TASO or directly to the requesting unit.

A major objective of this program is to provide rehabilitative training for inmates of the U.S. Disciplinary Barracks. At the present time, almost any type of woodworking can be done. Discussions are also underway with the Training Aids Management Agency, which may lead to an expansion of the program to include plastic forming — and all sorts of possibilities for displays, exhibits, and more sophisticated training aids.

The cost of fabrication materials and the shipment of the finished training aids is funded by the Training Aids Management Agency.

Though the program has been in operation only a short time, the facility has turned out over 11,000 separate items, ranging from dummy TNT blocks to ridges for Aggressor helmets, model parts for bridges, rifle rests, survey stakes, and paddle boards used in electronics training. □

Pages from the Past

The Cavalry Journal

In beginning another year of its life as the journal of The Cavalry Association, it is thought that a few words from the present editor may not be inappropriate. It is believed, upon good authority, that ours is the only cavalry association in the world which undertakes to keep alive a journal devoted to the interests of the mounted arm. Very few realize the difficulties encountered in such an enterprise.

To make such a magazine instructive and entertaining requires that the members of the Association should take an active interest in the discussion of subjects pertaining to cavalry. It is not expected that every officer should be possessed of remarkable literary talent, nor that his writings should always instruct others. Very few men will attempt to write for others upon any subject, unless they have given special study to it, and therein lies the benefit. Individual officers perfect themselves in particular lines, write of their beliefs and opinions, and thereby so fix the knowledge obtained as to make it of value to themselves in the future as well as interesting to their readers at present.

The Cavalry Journal
March 1896

Mounted Elements

Concerning the status of the horse in regard to a motorized Army, chief of staff, Gen. Malin Craig, in a letter to Senator Tom Connolly, of Texas, makes the following observations:

"I believe there is no probability of all horses being taken away from the Regular Army and National Guard this winter nor for many years to come.

"While mechanization and motorization have

and can replace the animal for many military purposes, I do not believe that a properly balanced army, able to operate in any theatre of operations, can ever dispense with a proper proportion of mounted cavalry and horse-drawn artillery.

"Since the United States does not ever contemplate organizing for aggression, it cannot choose a theatre in advance.

"Consequently its peace-time organization must keep alive troops that are universally highly mobile in all theatres of operations."

The Cavalry Journal
September-October 1937

Cavalry and the Air Service

In battle reconnaissance the governing element is time; hence, again the necessity for close and continual liaison between air and ground and thorough understanding of each by the other.

In the ideal reconnaissance activity the Cavalry and Air Service, as the reconnaissance elements per se, work together for the information of the command as a whole. It has been my observation in many studies of this subject that the idea is left in the mind of the student that each is working more or less independently for its own information, secondarily for the information of the command as a whole, less so of the Air Service than of the Cavalry. The principle to be emphasized is that stated above — that is, information for the whole of the command.

The Cavalry Journal
October 1923



THE ULTRA SECRET

by F. W. Winterbotham, C.B.E.
Harper & Row. 199 pages. 1975.
\$8.95.

"... Allied leaders knew virtually all German intentions before they were carried out, and in some cases Allied leaders were reading Hitler's orders before German generals in the field received them..."

The Ultra Secret is the story of the machine which enabled the Allies to perform the remarkable feat mentioned above, and of the system of dissemination of intelligence during World War II. The German code machine, Enigma, was reconstructed by the British from several sources and enabled the Allies to monitor the German High Command messages almost from the onset of the conflict in Europe. The possession of the machine is revealed for the first time in this absorbing book. The possible impact on our perception of the conduct of the war is, to say the least, "mind boggling."

The secret of the possession of the machine has been closely guarded for the past 30 years for reasons not well defined. The author suggests that the Allies did not want the Axis powers to blame their defeat on the machine. This explanation, however, is not totally convincing.

The unfortunate aspect of this newly revealed secret is that the majority of the military leaders who utilized the intelligence are now dead. It is hoped that those who remain will someday add their knowledge and analysis as to the true and full impact of the machine on the Allied strategy and tactics.

Group Captain F. W. Winterbotham, the author and a former RAF intelligence officer, was involved with the Enigma machine from its beginning, and was responsible for the development of the unique dissemination system which prevented the Germans from realizing that a copy of their code machine had fallen into Allied hands. He has written an extremely readable account of the Enigma machine's development and its impact on the various stages and battles of the war. The author reveals the responsiveness of the various leaders and

commanders to the intelligence produced from the machine.

The book not only covers the machine's successes, but also its two major failures, the disaster at Kasserine and the Ardennes battle. The author attributes the failure of the Enigma system to warn the Allies to the German commanders at the scene who were developing and executing an operation (Kesselring and Rommel at Kasserine) and to the radio silence maintained by the Germans (the Ardennes). The author also suggests that these failures may have been caused by an extreme dependency on the intelligence received from the Enigma machine and a failure to recognize other intelligence available to the intelligence personnel.

Several factual errors exist within the book which can be attributable to the passage of time. (The author wrote the book from memory because he was denied access to the official documents by the British government.) For example, the author has General Bradley, instead of General Frendendall, as the commander of American forces at Kasserine. However, these errors do not really detract from the book.

The book is currently a best seller across the nation with the American public. Its real value and impact lies with the American military because the book raises many more questions than it answers about the conduct of the war effort. *The Ultra Secret* also contains many lessons for the ground combat commander in the use or non-use of high level intelligence in the conduct of a tactical operation.

One warning must be issued to the potential reader of *The Ultra Secret*. The book was written 25 to 30 years after the fact by a man deeply committed to the operation of the Enigma machine, therefore the author has stressed the impact of the machine as he perceived it. The reader must remember that intelligence itself did not bring victory, but the commander and his forces who used the intelligence to develop the operations carried the war to its finale.

I strongly recommend this book to all military leaders and staff intelligence officers, because the lessons of World War II are invaluable to our thinking pertaining to the use of intelligence in the future. Regardless of whether or not *The Ultra Secret* will cause the reader to change his views of the various Al-

lied commanders, this book must be read for its lessons learned and its possible effects on our thinking concerning the conduct of military operations in World War II.

Captain Albert F. Leister Jr.
AOAC 1-75

PEACE IN THE MIDDLE EAST? Reflections on Justice and Nationalism

by Noam Chomsky. Vintage Books.
198 pages. 1974. \$1.95.

Hardly a day passes without clashes between Israelis and Palestinian Arabs. On a broader scale, there is talk of possible superpower intervention in the Middle East for economic reasons. The solution to the Middle East struggle is not yet at hand. Chomsky writes in *Peace in the Middle East?* that "it is difficult to be optimistic when considering the possibilities for a just peace in the Middle East."

Chomsky's book, a paperback, is a collection of essays prepared during the period 1969-73 which suggest the development of a socialist binational Palestinian community as the remedy for the self-destructive policies now being pursued by the Israeli Jews and Palestinian Arabs, both of whom claim territorial rights to lands with ambiguous boundaries.

The author's concept proposes a binational federation with political parity between partially autonomous Palestinian Arab and Israeli Jewish communities. The Arab and Jewish parties would cooperate fully in economic, social, and cultural matters. The establishment of common goals and the willingness to give up a degree of independence would be crucial aspects of Chomsky's plan for socialist binationalism.

Why socialist binationalism? Chomsky foresees ultimate Israeli destruction if local conflict and polarization continue. Terrorist attacks by the Palestinian Arabs and collective punishment by the Israelis keep the conflict smoldering. As the author sees it, there are no firm guarantees to Israeli security; Israel must recognize that its security rests to a great degree upon relationships with

its neighbors. The likelihood of an imposed settlement increases as the local protagonists fail to reach an accommodation. Without the solution of basic differences, an imposed settlement could not endure.

Chomsky outlines the major issues in the Israeli-Palestinian Arab dispute clearly and links the local conflict appropriately to the regional and global scene. His socialist solution is interesting, although the gap between such a federation and real-world relationships is enormous; no satisfactory mechanism is offered for bridging this gap. *Peace in the Middle East?* will be of special interest to readers who follow the Middle East scene seriously.

Lt. Col. William M. Stokes, III
First Infantry Division

DERVISH: The Rise and Fall of an African Empire

by Philip Warner. Taplinger. 235 pages. 1974. \$10.95.

Dervish is an engrossing study of colonial power coming to grips with a ragged native force led by a fanatical religious leader called the Mahdi. It is also an account of extremes in human courage, determination, cruelty, and, in some cases, stupidity. The Dervish uprising in the 1880's has also been classified as the last true "Holy War." Whatever title one may affix to it, it was by far one of the most bloody conflicts engaged in up to that time with no quarter being given by either side.

From the onset, the colonial powers underestimated the seriousness of the situation and the quality of the foe they faced. On the other side of the coin, the Dervish leaders also misjudged the most serious threat against their desired aims. *Dervish* describes the military achievement accomplished by what was believed to be a disorganized rabble. The writings of a Dervish leader, Sheikh Ibrahim Abd-el-Kadir shows the rabble to be well organized and also that the British were not considered their main opponents. Far more important were the Abyssinians, who ironically the Dervish crushed, and were later overthrown by opponents they underrated.

The Dervish Empire extended over a million square miles and was a remarkable achievement in an era when all imperial endeavor was thought to be a prerogative of the "white man." That they did this in itself was unbelievable, but more significantly, it was accom-

plished against the most prestigious nation of the time — Great Britain.

Mohammed Ahmed Ibn Al-Sayid Abdullah was born in 1844 at Lebab, an island in the Nile near Dongola. His strict religious upbringing, coupled with his exceptional powers of concentration and devotion, would years later weld together a force of religious fanatics that astonished the world. As a young man, Mohammed Ahmed was not popular and had a way of rebuking people who were his elders. He criticized the idleness and corruption of the Sheikhs and religious leaders; the fact that his criticisms were just, disturbed them less than the fact that he was stirring up feeling against the established order. By 1881 Ahmed's influence grew and his followers increased. His message was simple and unanswerable: "Trust in God. Scorn the so-called pleasure of this world and, by devotion, prepare yourselves for the life to come. Trust in God, and — whatever happens — all will be well in the end." It wasn't long before he began to be called "the Mahdi," which means one who guides.

Mahdi's principle assistants throughout his reign were Osman Digna and Khalifa Sherif. Both these men, while not as religiously exacting as their leader, believed enough in the cause to continue the struggle for years after his death. Their tactical expertise and ruthless quest for power provided the necessary tools to organize and conduct the military operations which were so significant throughout the history of the Dervish Empire.

The reader of *Dervish* will find many of the British military greats embroiled throughout this book in the desperate struggle to subdue the Dervish and restore order in the Sudan, such as General William Hicks, General Charles Gordon, Sir Ronald Wingate, and General Horatio Kitchener.

You will also read an incredible survival account of Charles Neufeld, who was a prisoner of the Dervish for 13 years. In addition, Winston Churchill, then a lieutenant in the 21st Lancers, describes his experience in a cavalry charge in the closing year of the war.

There are three main features about the Dervish episode: first, the astonishing quality of courage shown by the Dervish; second, the fortitude of the men who fought them, whether British, Egyptian, or Sudanese; and finally, the British achievement in rebuilding the country afterward. For a decade and a half, Mahdism controlled the Sudan through murder and cruelty to satisfy their cornerstone of religious intolerance and slavery. During the struggle,

two-thirds of the population — seven or eight million — died by violence or starvation. The tyranny, bloodshed, and cruelty were not unique to the Sudan. What is unique is the sharp contrast between good and evil.

The struggle was fought on some of the most hostile lands imaginable. Transportation and resupply routes ranged over desert and through the cataracts of the Nile. Hardships were a matter of course for both sides in their separate struggles. *Dervish* is a must book for any military historian; it is thought provoking, and focuses on major issues of that era; it is worth reading.

Major Charles E. Griffiths
AUS-Retired

GERMAN AIRBORNE TROOPS

by Roger Edwards. Doubleday. 160 pages. 1975. \$7.95.

A brief glimpse at the background, training, combat history, and personalities associated with the Luftwaffe's parachute units from their formation in 1936 to the surrender in 1945. Published as a part of the MacDonald Illustrated War Studies, *German Airborne Troops* contains many excellent photographs, most of which were obtained from German war archives. Good descriptions of "Fallschirjager" training, organization, equipment, and early combat operations abound. The near disaster on Crete, salvaged by the airlanding of the 5th Mountain Division, is well documented. The use of the airborne units as "Fire Brigades" in both the East and West is treated with less depth, but still retains the reader's interest, although one comes away with a great many questions about what is left unsaid.

The serious military historian is constantly led up seemingly blind alleys, due to the fact that the text is neither footnoted, nor is there any form of bibliography. In addition, the outline maps, with no topographic data and nonstandard symbols, make it difficult to follow the action described. Several glaring errors also detract from the text. As an example, the U.S. 82d Airborne Division is given credit for the defense of Bastogne in December 1944, when in fact they were on the north flank of the bulge, backing up the defenders of St. Vith.

For a book that portends to be "the most comprehensive account so far published in any language of the parachute and airlanding troops, Fallschirjager, of

the Third Reich," it has missed its mark. Perhaps it may contribute to the body of knowledge in this area if it stimulates serious study by a military historian. It appears obvious that the performance of airborne troops in the past is an area ripe for a more scholarly treatment. These strategically mobile forces still form a very high percentage of the world's military forces. The International Institute for Strategic Studies in this 1974-1975 "Military Balance" publication indicates that the free world maintains 11 Airborne Division equivalents in their force structure, while the Warsaw Pact and China maintain 16.

Therefore, due to the obvious importance of the subject matter, *German Airborne Troops* is recommended reading for the military professional, but with caution. Perhaps the best approach would be to read broadly in the field, approaching this one last.

Lieutenant Colonel David L. Funk
ARSV Task Force, USAARMC

HITLER'S WAR AIMS

by Norman Rich. Norton & Company, Inc. 548 pages. 1974. \$14.95.

Hitler's War Aims is quite an interesting book that provides an analysis of occupation policies that were established to carry out the objectives of purifying the German race and Lebensraum, the expansion of the German Reich into Eastern Europe. To the Germans it became idealistic and moral to carry out inhumane policies on a routine basis. In the occupied lands, people cooperated and made little effort to resist. Only in Germany did a resistance movement start to unseat Hitler. The Jews and the Slavs became the targets of exclusion. The inhuman treatment continued even after it became evident that Germany would lose the war. Hitler wanted Britain as an ally. Later when he had to fight Britain, he felt the U.S. would annex Canada upon Britain's defeat and eventually Britain and Germany would move against the U.S. His original policy toward France was to prevent interference with Lebensraum. He moved into Denmark, Norway, and the Benelux countries to prevent a British-French invasion. In most cases, he expected a warm welcome from these countries that he expected to incorporate into the German Reich. Mussolini interrupted the German peaceful conquest of Southeast Europe, but nevertheless Bulgaria, Hungary, and Rumania became satellites with varying degrees of independence; occupation policies almost destroyed

Yugoslavia while Albania and Greece were incorporated into Italy's sphere of influence; and Italy became an occupied country with a plan for annexation after its surrender to the allies. Austria was to be the model for incorporating countries into the German Reich. The Czechs, foreigners in the midst of a German community, had to be removed, but Hitler eventually left them alone. Poland was divided into two parts, one to be resettled by Germans, and the other to be exploited and to serve as a dumping ground for undesirable elements. The entire Baltic area and Eastern Russia were to be resettled by Germans, who would return from all over the world. After political leaders and Jews were removed, the natives would be used for labor. With consistency, the German Reich moved forward, yet other policies seemed to repudiate that program. How could the non-Aryan Japanese be accepted? Himmler was primarily responsible for converting these aims and theories into reality, and the discussions of this conversion makes interesting reading for historians or public administrators.

Lieutenant Colonel Carl M. Putnam
Chief, Atlanta Readiness Group

THE USE OF FORCE IN INTERNATIONAL RELATIONS

by F. S. Northedge. The Free Press. 258 pages. 1974. \$12.95.

F. S. Northedge is Professor of International Relations at the London School of Economics. He has collected and edited nine essays written by himself and his colleagues, mostly research workers at the London School of Economics. These essays consider the international use of force from its various aspects; political, legal, moral, and so on.

These studies are most refreshing in that they do not try to justify the policies of one nation-state or another. Using marvelous intellectual discipline, Mr. Northedge and his colleagues describe the realities of force in the interplay of relationships between nation-states. While they readily admit that use of force by the superpowers, even on a limited scale, is uncontestable, certain nation-states still will need to exert their will against others. Due to the dangers of overt military force and world opinion against it, nations are forced to look to more devious means. Even subversion and guerrilla movements are becoming more and more costly and dangerous to world peace.

Thus, the search for substitutes will continue. The authors have not offered us any remedies, but they have sought to inquire into the how and why nations resort to arms.

While written prior to the October War, this book will certainly assist any reader in developing a better understanding of the current arms buildup throughout the Mideast. It will also give the reader a better appreciation of the oil embargo as a new alternative to military force in the relations between nation-states.

Colonel C. A. Mitchell
USATCA

EISENHOWER: Portrait of the Hero

by Peter Lyon. Little, Brown and Company. 1974.

Eisenhower: Portrait of the Hero is an outstandingly written and unbiased look at the entire life and development of one of America's true heroes. Peter Lyon takes the reader through the phases in Dwight Eisenhower's life during which he transcends from a smalltown Kansas farm boy, into a West Point cadet, through an undistinguished and somewhat frustrating military career during World War I, into the period of time in which he had under his control what could have been the greatest land fighting force ever assembled. Finally, Eisenhower is shown as President of the United States at a time when it was unquestionably the most powerful nation in the world.

The general portrayed as an arbitrator, as well as a leader in World War II, gives the reader a new outlook on his role during this period of time. Especially interesting are his personal relationships with Montgomery, Churchill, Patton, Truman, Marshall, and, as President, with Dulles and McCarthy. The single quality that renders *Portrait of the Hero* superb is that it furnishes a look at Eisenhower's life from a perspective as seen 15 years later. This provides the reader with the proper overview from which to view this soldier, general, and statesman in relation to what has transpired in the years hence. Although quite lengthy, *Eisenhower: Portrait of the Hero*, is a well researched, accurately documented depiction of Dwight Eisenhower that is essential reading for those who enjoy a good biography.

Captain Joseph W. Sutton
Armor



ARMOR *the Magazine of Mobile Warfare*

U.S. ARMY ARMOR SCHOOL

Post Office Box O, Fort Knox, Kentucky 40121

FROM THE EDITOR

How did *ARMOR* do on its Reader Survey earlier this year? As a matter of fact, very well. There were hundreds of favorable comments which help the magazine staff feel like it is doing the job. There were numerous constructive suggestions, several unreasonable requests and a few derogatory remarks. In a nutshell, our varied readership endorses controversial and professionally-broadening articles, plus informative features and departments on training and developments. Many readers feel that *ARMOR* must never become a "hand-book" or "manual." It should remain mainly a forum for the free exchange of ideas.

It has been said that a reader survey reflects only the views of those who are enthusiastic or critical; the satisfied usually do not bother to return their survey. I feel this was not the case with this survey. We heard from a cross-section of our readers.

The percentage breakdown of surveys returned were: general officers 2%, field grade 25%, company grade 44%, enlisted 12%, civilians 15% and ROTC 2%. The level of reader interest in types of articles and departments is listed by percentage below:

DEPARTMENTS	High Reader Interest	Good to Fair Reader Interest	Low Reader Interest	Not Read
Commander's Hatch	53%	20%	13%	14%
Letters	52%	23%	18%	7%
Armor Branch Chief	37%	31%	24%	8%
Forging the Thunderbolt	36%	37%	18%	9%
Short, Over, Lost, Target (Opinion)	32%	42%	20%	6%
News Notes	26%	27%	37%	10%
Pages From The Past	21%	38%	32%	9%
How Would You Do It?	17%	31%	34%	18%
Book Reviews	16%	22%	47%	15%
Hot Loop	14%	25%	42%	19%

ARTICLES	High Reader Interest	Good to Fair Reader Interest	Low Reader Interest
Tactics & Doctrine	81%	15%	4%
Armor Research and Development	65%	22%	13%
Foreign Developments	37%	32%	31%
Training Experience	32%	45%	23%
History & Nostalgia	30%	36%	34%
Leadership & Professional Philosophy	26%	32%	42%
Maintenance	15%	31%	54%
Personal Experience	15%	33%	52%
Logistics	3%	23%	74%

Coming in **ARMOR**

"Old Lessons Learned"

An analysis of lessons learned from past wars, including the October War, supports Major K. Peter Hein's contention that the tank is still the main weapon on today's battlefield.

"Armored Reconnaissance Scout Vehicle Test"

The role of the ARSV Task Force in determining the optimum scout vehicle for the future is discussed in an article co-authored by Lieutenant Colonel David L. Funk, Chief of the Test Branch of the project, and Captain Donald C. Snedeker, a former member of the unit.

"Evolution or Revolution in Tanks"

William T. Hunt, Chief of the Vehicle Branch, Research, Development, and Engineering Directorate, Army Materiel Command, describes the upgrading of the M-48 and M-60 series tanks and gives a brief preview of some of the innovations that will appear in the XM-1 tank as a result of a thorough assessment of the many facets of the battlefield employment of tanks in the future.

"Tank Gunnery Under Fire"

Lieutenant Colonel Charles E. Honore, commander of one of the first battalions to fire the revised Table VIII on Range 80 at Grafenwoehr, evaluates the changes that have been made to improve tank gunnery training and suggests additional changes that would make gunnery training even more realistic.

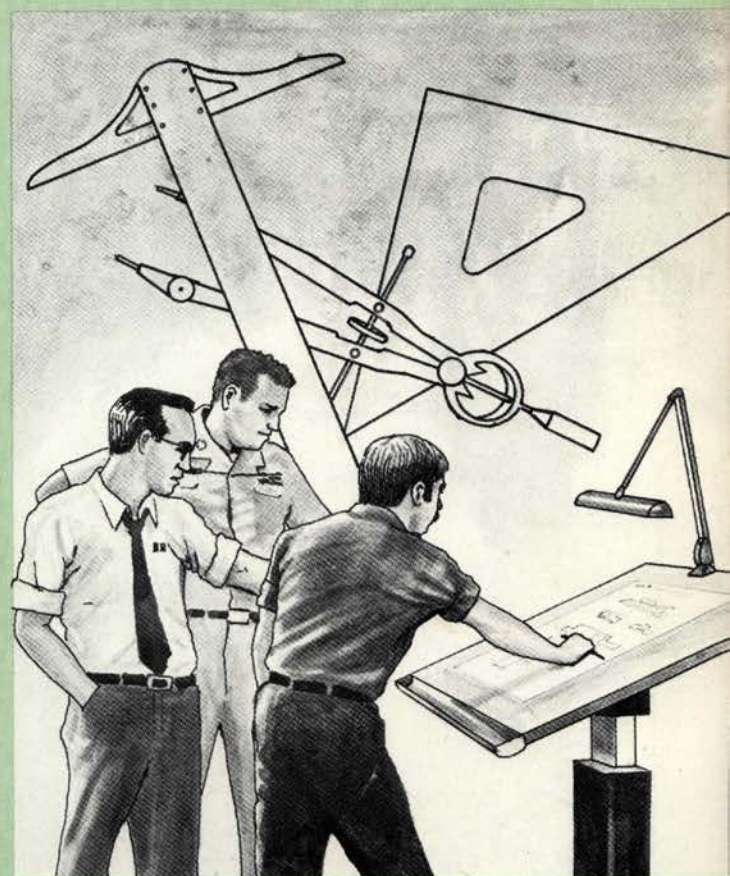
"Cuirassier - A New Tank Destroyer"

Walter A. Hamburger takes a comprehensive look at the new Austrian tank destroyer Cuirassier, an interesting vehicle which, although much smaller and lighter than conventional tanks, has demonstrated its versatility and durability in recent comparison tests in France.

ARMOR

september-october 1975

EVOLUTION AND REVOLUTION IN TANKS



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"To disseminate knowledge of the military arts and sciences, with special attention to mobility in ground warfare; to promote professional improvement of the Armor Community; and to preserve and foster the spirit, the traditions and the solidarity of Armor in the Army of the United States."

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13 Evolution and Revolution in Tanks*William T. Hunt***19 Tank Gunnery Under Fire***Lieutenant Colonel Charles E. Honoré***30 Old Lessons Learned***Major K. Peter Hein***37 Armored Reconnaissance Scout Vehicle Test***Lieutenant Colonel David L. Funk**Captain Donald C. Snedeker***43 Assault Gun/Tank Destroyer***Captain Stephen D. Turner***56 Cuirassier—A New Tank Destroyer***Walter A. Hamburger***2 LETTERS****5 THE COMMANDER'S HATCH****10 FORGING THE THUNDERBOLT****18 PAGES FROM THE PAST****24 PROFESSIONAL THOUGHTS****26 SHORT, OVER, LOST OR TARGET****49 HOT LOOP****51 OPD-ARMOR****53 DID YOU KNOW?****54 NOTES****59 BOOKS****Cover**

Down through the years, tank design and production have been essentially evolutionary, with newer models being not much more than upgraded versions of their predecessors. Now, engineering technology offers an opportunity for revolutionary improvements in tanks of the future; some of which are discussed by William T. Hunt in his article, "Evolution and Revolution in Tanks," beginning on page 13. (Illustrations by Steven Flanders).

Battlefield of Seconds

Dear Sir:

The article "A Battlefield of Seconds" compressed ideas and lively discussion as succinctly as one hopes the battlefield lieutenant will shave exposure-time seconds. It also brings to mind some ideas which might spark further discussion.

Both flare and chaff dispensers were mentioned. But what about command guided and beam riding missiles (like *Roland II*)? Jammers can be heavy and still be ineffective. Is there a vulnerability to exploit? Possibly the vulnerability to exploit here might be any missile's vulnerability to properly timed shock waves: explosive blasts can destroy or predetonate helicopter-hunting missiles. So why not dispense an explosive aerosol (fuel air explosive—FAE) and electronic detonators in front of exposed helicopters so that it can be command (or missile exhaust) detonated at missile-lethal overpressures as the first antihelicopter missiles traverse the "missile minefield"? (Let the analysts elect a missile spotter; electronically this is a tough problem, for the U.S. Air Force is just now getting around to developing simple scanning radars to overlook the exhausts of their expensive *F-15*'s as warning devices against *Side-winder*-type missiles, and don't forget, in deep sky, there are *no* hullo down positions! For a helicopter at least, by using a relatively stationary aerosol which enemy missiles *must* transit, the computation problems of timing are made a lot simpler.)

If real fuel, chaff window, and "chaff gliders" had been mixed into the aerosol, the helicopter would benefit from the concoction's deceptive "afterglow". Succeeding missiles would be faced with the impossible task of "seeing" the helicopters behind a vast wall of flaming fuel, flares, metallic hot spots, radar-decoying chaff window, and doppler deceiving returns from blast accelerated "chaff gliders" or "chaff balls". Even an opaque or shiny laser reflecting screen could be blast triggered to produce cover, against any electro-optic homing missile, that was closer to reach than the original masking-terrain. Buckshot blasts from mini-Claymore Mines could finish off the surviving few antihelicopter missiles to grant the aerial killers a few more precious sec-

onds with which to press home their own attacks.

It should take only a small investment to see if the present expensive inventory can be even better protected than by surprise alone.

If all of this does not work against missiles (knock on wood), then it would seem doubly worthwhile eliminating quad-23's—not to mention very personal, very unanalytic prejudices against that species, even if missiles remain as a major threat! Earth-hugging helicopters at least create the benefit (sic) of drawing enemy anti-aircraft weapons forward to battle. Any gun's weak link is the time needed for acquiring and computing range-finding data. But this might not be the fastest or most reliable weak link to exploit.

For quad-23's not preempted by artillery, smoke, and rockets, the *fastest* antidote just might be a Mach 4.5 tungsten bolt.

A handful of hull-down *M-60*'s, or maybe even *MICV*'s, might be able to hide from the enemy's main body while maneuvering to concentrate fire upon the helicopters' real nemeses.

In turn, overwatching missile-armed helicopters might be one of the best remedies against enemy long-range kinetic energy (KE) fires opposing friendly armored counterattacks.

Who knows? Perhaps after a while, enemy frontline use—and attrition—of *ZSU-23*'s might be welcomed by battle captains (but not battle lieutenants!), for eventually it could help offer an opportunity to sneak NOE integrated jet/copter strike teams past "no man's air" into the enemy's backyard. There they could find, corral, and then pulverize those vulnerable, high-technology targets so needed—and irreplaceable—in modern battle management. General Arik Sharon's October '73 SAM-busting raid on the Suez Canal's west bank is brought to mind as an example of the benefits sought by such beyond no man's air risks. Generally, it is acknowledged that his raiding tactics unleashed the Israeli air force's firepower.

Frontline attrition of *ZSU-23*'s, and antimissile FAE dispensers might help build those important tunnels past no man's air into the vulnerable enemy logistics, maintenance, and headquarters centers where victory is to be found. Considering this now might be more important than ever. Traditionally the

air forces could be relied upon to accomplish these important missions. But modern technology might have partly closed off all single weapon tactics such as those used by jets. In any case, it can't hurt to ask the researcher and analyst to take a good look.

RICHARD GRIEST
Oakland, California 94609

M-60A2 Comments

Dear Sir:

Permit me to make some observations about the *M-60A2*.

With the advent of the *M-60A2* in the Army inventory, many commanders at all levels are probably asking, "What do I do with the *M-60A2*?"

No, that's not what you do with it. Your first comment to this question is probably based on what you've heard rather than what you've seen or done. True, the "Deuce" is the proverbial horse of a different color because it is the most complex, sophisticated tank on the battlefield today, but it provides a commander with a tank which has a first round hit and kill capability of greater than 90 percent at ranges of 3,000 meters and beyond.

Let's look at a situation. A company of *M-60A2*'s, at only 76 percent availability in a defense position, sees an enemy regimental-size tank formation deployed and approaching it at a speed of 30 km.p.h. The range is 3,000 meters, a not really too unrealistic range to a commander who has been able to successfully employ his force on dominating terrain. Opening the engagement at 3,000 meters, the friendly force commander can destroy 46 enemy tanks before they close to 2,000 meters, and another 46 tanks before they close to 1,000 meters. This is based on an enemy movement of 500 meters per minute, 13 operational *M-60A2*'s firing 1 missile per 30 seconds with the hit probability of 90 percent. This type of kill rate cannot be achieved by any two *M-60A1* companies. The total missile expenditure per vehicle for such an engagement would be 8.

But the Deuce isn't only a defensive weapon, it's a powerful offensive weapon system too. At a closing speed of 20 km.p.h., firing the conventional 152-mm HEAT round, stabilized, it has a higher probability of hitting a target at

1,200 meters than the *M-60A1* stationary at that same range.

Couple these gun/launcher capabilities with the coaxial and caliber .50 machineguns, which are independently stabilized, and the commander has a tank which is a potent killer, an effective fighting weapon on any battlefield. Fiction? A line of BS? No; fact.

What else can you do with an *A2*? You can engage enemy aircraft with the caliber .50 machinegun three times more effectively than an *A1*; this being due to much easier, much faster elevation and traversing systems which are electrohydraulically operated and stabilized. The stabilization system, besides being used to increase weapon system accuracy on the move, can also be used to provide extremely accurate azimuth orientation on the move. Targets can be engaged at night with no illumination in the direct fire mode with the 10 power passive light magnification system which is similar, but much, much more effective at much greater ranges than the old "Starlight" systems. With the laser rangefinder, you can determine accurate range to the nearest 10 meters. With the electronic computer, you can determine and place firing data into the fire control system to compensate for everything from gun tube droop to drift, merely by flipping a switch. Also, with the electronic computer, you can accurately determine lead for moving targets at any range, and place the lead in the system automatically with the push of a button.

The preceding paragraph presupposes a properly trained crew. It's nice to think we can take cooks, truck drivers, and infantrymen, train them on a tank for 2 days and make them effective tank crews. Well, we have armor crewmen today who have been trained on the same type of tank for years and they aren't even effective crews. The "Deuce" needs to have its crews train on it extensively, more seriously, and with greater crew integrity than any other tank we've fielded to date. Even a distinguished *M-60A1* tank crew will require a minimum of 40 hours transition to reach basic proficiency on the "Deuce." This is based on a one to two ratio of qualified crewman to trainee, and does not include any firing of the vehicle. A four-man crew would require one instructor for 120 hours to go from no knowledge of the vehicle to completion of Table VII.

The *M-60A2* is the tank of the 70's, or rather, it can be if only we will let it. Don't be afraid of it. It's not a monster. It's not as complex or delicate as an aircraft, but it will require training, main-

tenance and more care than the *M-60A1*. Try it—you'll like it, and it will relieve the upset stomach caused by the outnumbered situations we can expect to see on the battlefield of the future. The "Deuce" gives us just the edge we need to reduce odds until the *XM-1* is fielded.

The *M-60A2* is an interim tank to span the time frame between the present main battle tank, the *M-60A1*, and the main battle tank of the future. While we have it, let's use it.

JOSEPH D. MOLINARI
Captain, Armor

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Dragoons and Hussars

Dear Sir:

I am writing to correct a small error in the article, "Dragoons and Hussars," by Captain Caine (a very sound and well reasoned piece). The type of horse cavalry he contrasts to *dragoons* are termed *cuirassiers* or *horse grenadiers*, not *hussars*. I write not to nitpick, but because I am convinced that far too many people have no concept of the history of horse cavalry. The two, and only, commonly known cavalry engagements are classics in the misuse of the arm: the United States 7th Regiment at the Little Big Horn and the English Light Brigade at Balaclava.

The only types of cavalry commonly known are the *dragoon* (especially as he appeared in the American West) and perhaps the *hussar* (who is only vaguely understood). I think the problem lies in the tracing of American military heritage back to the English Army. The English never had particularly good cavalry, nor used particularly well in the field what they did have. The root of the problem was that mounted troops were expensive and required more training than infantry, and hence were always a stepchild to the primarily infantry armies raised by cost conscious Washington and London governments. Enough sabers were never massed to form a body capable of decisive military action, besides which, since they were so few, what cavalry did exist was pretty utilitarian. Consider that it took *four regiments* to form the "Light Brigade" of 600 sabers and lancers and that, although there were four regular and many militia cavalry regiments formed during the American Revolution, General Washington could seldom count on even 200 or 300 horsemen for a battle.

To find a cavalry arm worth the name, one must cross the channel and examine the continental armies. They had a much higher appreciation for

what good cavalry could do, and organized and equipped theirs accordingly. Consider that at Waterloo, which was primarily an infantry battle, the French committed 12,000 cavalry in, perhaps, the most spectacular charge of all time. The mind boggles at the thought of that much cavalry in one place; you can't fit that many on a TV screen. During its peak effectiveness in modern time (say 1650 to 1850), cavalry was grouped into three classes: heavy, light, and *dragoons*. There was some overlap and differences between national definitions so that two units with the same designation, such as *hussar* or *dragoon*, might be equipped and employed as different classes by different countries. *Hussars*, in particular, were prone to gradually "upgrade" themselves because of their status as elite formations until they were, in fact, heavy cavalry. *Dragoons* went both ways, heavier and lighter, and some were reequipped as lancers. On the whole, though, they were delineated as follows.

Heavy cavalrymen (or simply "Cavalrymen") were armed with a straight saber for thrusting, and perhaps a brace of pistols. These were large men on big horses who achieved striking power through mass, shock action, and brute, crushing force. Picture 3,000 horsemen in steel helmets, or the bearskin and red plume of *grenadiers*, perhaps with armored breastplates (*cuirassiers*), riding boot heel to boot heel, not charging, since that might disrupt the formation, but advancing at the trot. Cool, disciplined, highly trained, awesome. This was not a force to commit lightly. They were carefully husbanded and committed only at the climax of great battles. The Emperor Napoleon liked to keep 10 to 20 regiments of heavy cavalry on hand for such occasions; the United States never formed any.

Light cavalrymen were armed with a curved saber for slashing, pistols for close combat, and a carbine for mounted skirmisher fire. They were normally smaller men on more agile horses. They are best described as "dashing", and are personified by the *hussar*, that man at the royal ball with "that little coat you never wear" flung over his left shoulder (to keep his sword arm unencumbered). In combat, they charged at the gallop and the run. No need for tight formations since they lacked real power if their opponent stood firm, but capable of quick reaction and raising all kinds of hell against a disorganized opponent. They had no proper place on the field of battle and were not used there. They protected the flanks of the battleline by the threat of attack, skirmished with

the opponent's light horse, and stood ready in reserve to exploit the hole made by the heavy cavalry, or screen the retreat if they failed. They were most active between major battles in reconnaissance and raiding missions.

The *dragoon* was arrived at from various directions by different countries so that he might be either a heavy cavalryman, who was trained to fight dismounted or a light infantryman, who was trained to fight mounted. He was normally equipped with a straight saber, pistols, a musket, and bayonet. *Dragoons* fought as infantry or cavalry, but units of regimental-size and larger could not change roles quickly. They were normally committed to a given battle, either mounted or dismounted, and stayed that way. There are several instances in the American Civil War of the roles being successfully changed in battle, but there was always the problem of sheltering the mounts and the inherent defenselessness while mounting or dismounting. Mass employment of *dragoons* as mobile infantry was never really attempted, nor was commitment as heavy cavalry, since they could never match the pure form of either. They were very useful for screening, raids, and countering light cavalry. In the Napoleonic Wars, they were heavily committed to antiguerrilla duty. Almost all American and English cavalry, regardless of its official designation, were *dragoons*. "Light" dragoons, however, are more properly considered light cavalry, since they could not fight as infantry when dismounted because they had a carbine instead of a musket.

Obviously, the tankers are direct descendants of heavy cavalry, and the reconnaissance units continue the light cavalry mission. Modern mechanized infantry is much more flexible than the horse *dragoons*. The point, though, is the striking similarities between the classic horse cavalry missions and those of armor, in its broadest sense. In his book *Panzer Battles*, General Von Mellenthin remarks how fitting a repayment the German drive across France in 1940 was for the French pursuit after Jena in 1806. The more I think about this, the more I agree with this cavalryman about these two similar cavalry exploitations and pity those who do not know of Murat. Perhaps some day, an American cavalryman can drive from southern Germany to Danzig on the Baltic and report to his commander. "The battle is ended because there is no one left to fight."

VINCENT R. O'MAHONY
2LT, Armor
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Combined Arms Team

Dear Sir:

An article written by Mr. R. M. Ogorkiewicz in the fall of 1974 revives the suggestion that tanks and infantry should be combined in the same combat units. In the late 1940's, after the war, such an establishment was tried out in the British Army, and although never tested in combat, it showed promise.

At that time, the Infantry Division was allocated a Divisional Reconnaissance Regiment, Royal Armoured Corps. It was the only armor (except SP artillery) organic to the Division, and its role was reconnaissance, advance and rear guards, flank protection, etc.

The establishment of the Regiment was a Headquarters Squadron, incorporating the independent reconnaissance troop and the administrative and support elements, and three Sabre Squadrons. Each of the latter had a Sqdn. HQ Troop of two *Cromwells* with 75-mm gun and two with the 95-mm close-support howitzer, two tank troops each of four *Cromwells* (75-mm) and three Assault Troops in *Ram Kangaroo* APC's. Plus, of course, assorted scout cars, command vehicles and soft-skinned vehicles.

The Assault Troop, of 30-35 all ranks, was heavily armed for the time, with four .30 caliber Brownings mounted on the vehicles, four Brens, two PIAT antitank projectors, a 2-inch mortar and the usual personal weapons, grenades, mines, etc.

With this establishment it was possible to be very flexible in the way troops were committed: three tank/assault troop teams, tank troops immediately supported by three assault troops, etc. The immunity of the *Ram* (except against airburst) enabled the assault troops to be right up with the tanks if needed, and it was quite feasible to drive right on to an enemy position in the APC's, given the right circumstances.

Being of the same regiment and the same combat subunit, and on the same radio net, with the same esprit de corps, the tank and assault troopers established a rapport and battle drill that was far better than that of "infantry under command" from an infantry battalion, and this resulted in a fast-moving hard-hitting battle potential.

If the same establishment and organization could be brought up to date, with modern equipment and firepower, imagine the effect. A formidable firepower and flexibility: say 36 MBT's in

a regiment, and the same number of MICV's, with 8-mm mortars, ATGW and a profusion of automatic weapons.

This goes even further than the ideas of the French and Swiss armies of today, where the tanks and infantry are segregated by companies, but it has been done, and could be done again. It does not mean that there should be no units which are exclusively either "armor" or "feet", but that the activities of each are complementary, and there should be more thought given to the integration of both elements, particularly in the flexible stages of combat, before the higher echelon commander can decide whether the circumstances require tank-heavy or infantry-heavy forces.

N. AYLIFFE-JONES
Ashted, England

"We Can—We Will"

Dear Sir:

Now that the 1st Squadron, 9th Cavalry has reverted to its former ground cavalry role, I think a few accolades are in order. For more than 9 years, the "Real Cav", as it was called in the 1st Cav Division, served magnificently as air cavalry. The squadron, the first air cavalry to serve in combat, led the way in developing tactics and techniques which made air cavalry so effective in Vietnam. Later, as part of the Air Cavalry Combat Brigade, it developed and tested concepts for midintensity type conflicts.

The "Real Cav" lived up to its motto, "We can — we will". The squadron was, without a doubt, the point of the First Team Saber. The troopers continually rode to the sound of guns, and spearheaded every major battle in which the 1st Cav Division participated during Vietnam. In late 1970, the squadron became the control headquarters for a brigade-size air cavalry task force that involved 10 different air cav troops, two ground troops, a ranger company reinforced by the Blue Max, 2-20 Aerial Artillery. When the division came home in early 1971, portions of the reinforced squadron remained to fight alongside the III Vietnamese Corps in Cambodia.

Wherever there are former members of the First Team, there will be memories of those proud 1-9 troopers with the black Cav hats. Their courage and readiness to do battle was infectious and almost legendary. I regret the revision, but recognize that it is only proper that the 1-9 remain with the 1st Cav Division.

CARL M. PUTNAM
LTC, Armor
Jonesboro, Georgia 30236



THE COMMANDER'S HATCH

MG DONN A. STARRY
Commandant
US Army Armor School

TANK DESIGN: OURS AND THEIRS

Part I

Recently, and for perhaps ten years or so, it has become fashionable to ask why Soviet tanks appear to be smaller, lighter, faster, better gunned, and cheaper than U.S. Army tanks. What do the Soviets know about tank design that we don't? Why can't we build tanks like theirs?

Faced with a growing clamor to answer these and similar questions about tank design in other countries, the Armor Center analyzed tank design. Some of what we found is important enough to be reported on in these pages. Because of the length of our report we have serialized it. In this issue we introduce the subject and trace tank design up to World War II. In the next two issues we will continue the chronicle, first through the World War II period, then for the years since 1945.

While many facts help explain why tanks are as they are, and how they got that way, several major influences are readily apparent, and should be noted at the outset.

First, the physical characteristics of tanks—size, shape, height, weight, gun, armor—tend to give evidence of operational concepts tank users had in mind for their employment. For example, if tanks are viewed primarily as support for dismounted infantry, then they tend to have big guns, lots of armor, and not so much horsepower as tanks designed for offense as part of a mobile weapons team.

Second, to some degree at least, tank design is also affected by national military policies which reflect the underlying attitudes of a country about employment of its armed forces. For example, a country, whose leadership believes that numbers always win in battle, tends to buy lots of relatively cheap tanks that are good enough to fight, but which they believe they can afford to lose in considerable numbers.

Third, at the micro-level of design—guns, armor,

power trains, fire control—tank characteristics tend to reflect the outcomes of a process very much like the children's game of "rock-scissors-paper." A bigger gun can be countered by more armor, both add weight; requiring more powerful motive systems; more horsepower permits more armor, which begs a bigger gun; both add weight; requiring still more powerful motive systems, and so on.

Fourth, overall, tank systems tend more or less to show off certain underlying capabilities and shortcomings of a nation's industrial system. This is true of total industrial capacity as well as the capability to excel in one or more technologies or processes. American industry's competence in developing automotive power plants—engines and transmissions—and our inability to make good tank guns reflect in the fact that historically American tanks tend to be outgunned, but fairly well equipped automotively.

Finally, tank development reflects the decision processes and management systems which acted to produce the tanks. This is especially true of decisionmaking patterns as between user and developer, and decisionmaking within the research, development, and test and evaluation process itself. For example, the U.S. Ordnance Department's unilateral rejection of J. Walter Christie's tank design proposals in the 1930's deprived the U.S. Army of some very advanced technical ideas—it took 20 years to catch up.

An historical resume of tank developments since 1918 serves to illustrate these assertions.

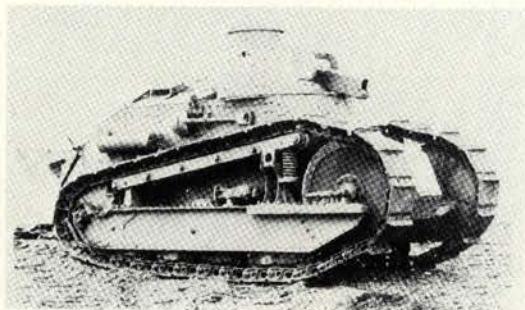
1918-1940

The tank was born in World War I. Its purpose was to restore mobility to battle by providing an armored gun platform from which gun crews could destroy machinegun positions unencumbered by

wire and trenches, protected from small arms and artillery fragments. In operational concept, it was a weapon to support the advance of dismounted in-

fantry. Two basic tank types were developed and used—the French *Renault* and the British *Mark IV* series.

FRENCH RENAULT



Crew: 2
Armament: Machinegun
Armor: Boilerplate

Suspension: Caterpillar treads
Engine: 39 h.p.
H.p./ton: 5.3 Speed: 6 m.p.h.

BRITISH MARK I-IV SERIES (MK IV Shown)



Crew: 8
Armament: 2 6-pounder cannon,
4 MG
Armor: Boilerplate

Suspension: Caterpillar treads
Engine: 105 h.p.
H.p./ton: 3.75 Speed: 3.7 m.p.h.

Following World War I, several operational concepts about tanks evolved. These concepts, combined with national military policies of the powers involved, are reflected in tank design in the years 1918 to 1940.

The idea of using a combined arms team of tanks, infantry, and artillery as an offensive battle system to destroy an enemy defense system and to exploit into his rear areas was born of the genius of Major General J. F. C. Fuller and Captain B. H. Liddel-Hart in England. The idea was seized on by General Heinz Guderian in Germany, and was the genesis of the *Blitzkrieg*. The Germans transplanted the concept to the Soviets, in whose country they (Germans) operated a tank factory in the late 1920-early 1930 period.

Germany. The German operational concept was *Blitzkrieg*. The instrument to achieve *Blitzkrieg* was the Panzer Division—*panzers* (tanks), *panzer grenadiers* (mechanized infantry), *sturmartillerie* (self-propelled artillery), and *stuka* (close tactical air support). Tanks developed to enable the panzer division to accomplish *Blitzkrieg* were:

PK-IIC



Crew: 3
Armament: 20-mm cannon,
1 machinegun

Suspension: Elliptic spring
H.p./ton: 15.9 Speed: 25 m.p.h.

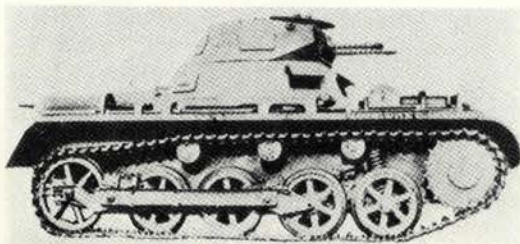
PK-IIID



Crew: 5
Armament: 37-mm cannon, 3 MG

Suspension: Coil spring
H.p./ton: 21.3 Speed: 25 m.p.h.

PK-IA



Crew: 2 Engine: Gasoline
Armament: 2 machineguns

Suspension: Leaf spring
H.p./ton: 17.2 Speed: 25 m.p.h.

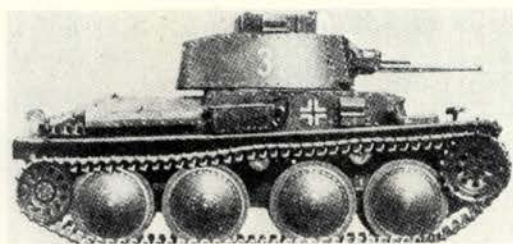
PK-IVA



Crew: 5
Armament: 75-mm cannon, 2 MG

Engine: Gasoline
H.p./ton: 18.0 Speed: 18.5 m.p.h.

PK-38t CZECH



Crew: 4
Armament: 37-mm gun, 2 MG
Engine: 125 h.p.
H.p./ton: 12.8 Speed: 21 m.p.h.

Mobility—The *Blitz* in *Blitzkrieg* dominated armament and protection.

Soviet Union. The Soviet version of *Blitzkrieg* matured into the *Breakthrough* attack. In this concept, combined arms offense dominates, but does so more by gunpower and weight of numbers than by mobility. Soviet tanks reflected this bias. Less mobile than German tanks, they had more armor and by far the best tank guns in the world; in 1940, the Red Army had 10,000 of them.

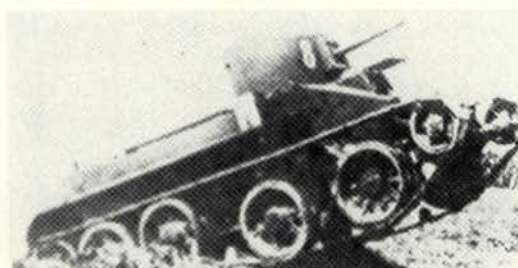
Gunpower and mobility—necessary to make the *Breakthrough* attack work—dominated armor. Soviet tanks were good enough, and produced in overwhelming numbers; their operators believed they could win.

T-26 B



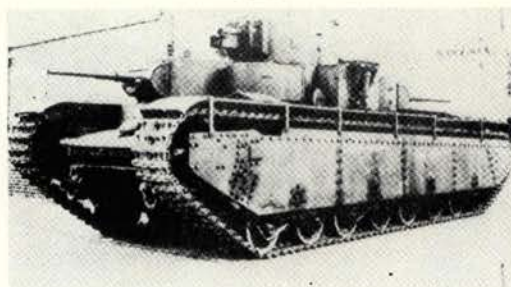
Crew: 3
Armament: 37-mm gun, later 45-mm gun
Weight: 10.3 tons
Construction: welded

BT-2



Crew: 3
Armament: 37-mm gun, 2 MG (7.62-mm)
Construction: Riveted
H.p./ton: 39.2

T-35



Crew: 10
Armament: 76.2-mm gun on main turret, 2 45-mm guns on aux. turrets
H.p./ton: 11.1 Speed: 18 m.p.h.

BT-7



Crew: 3
Armament: 45-mm gun, 2 MG
H.p./ton: 32.6 Speed: 45 m.p.h.
Suspension: Christie
Engine: Aero-type

No other army in the world espoused offensive use of the combined arms as did the Germans and the Soviets. In America, Britain, and France, the dominant view was that tanks were for the support of dismounted infantry.

France. In France, this concept led by 1940 to the dispersing of the French tank fleet of 3,500 piecemeal throughout infantry formations of the French Army. Spread thin and attached out in small numbers, they were no match for the *Blitzkrieg* attacks of panzer divisions, wherein fewer tanks concentrated to produce overwhelming local odds and

CHAR DI INFANTRY TANK



Crew: 3
Armament: 47-mm gun, 2 MG (7.5-mm)
Suspension: Vertical coil spring and hydro-pneumatic shock absorber
Construction: Riveted
H.p./ton: 5.0 Speed: 11.3 m.p.h.

SOMUA S-35



Crew: 3
Armament: 47-mm gun,
MG (7.5-mm)
Suspension: Coiled and semi-elliptic leaf spring

Construction: All-Cast hull
and turret H.p./ton 9.5
Speed: 25 m.p.h

RENAULT R-35



Crew: 2
Armament: 37-mm gun,
MG (7.5-mm)

Suspension: Scissors horizontal
coil
H.p./ton 8.2 Speed: 12.5 m.p.h.

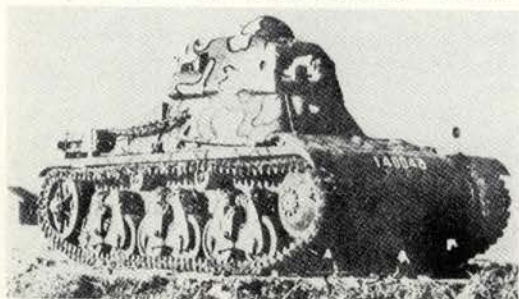
CHAR B1-BIS HEAVY TANK



Crew: 4
Armament: 60-mm gun on turret, 75-mm gun, MG (7.5-mm)

H.p./ton: 5.6

HOTCHKISS H-35 LIGHT TANK



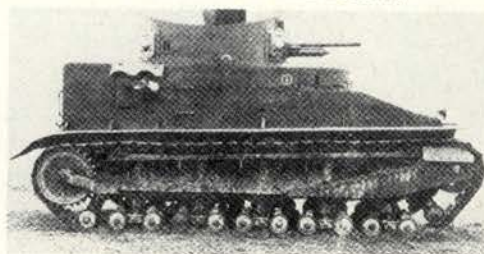
Crew: 2
Armament: 37-mm gun, MG

Suspension: Scissors w/hori-
zontal spring
H.p./ton: 7.0 Speed: 17 m.p.h.

drove the combined arms team through French defenses in short order. French tank design and employment reflected their inability to grasp German *Blitz*, Soviet *Breakthrough*, or the essentials of combined arms employment.

Britain. In the United Kingdom, despite the fact that the combined arms team idea was born there, the official British view was that tanks were primarily for support of infantry. It was further conceded that once the tank-dismounted infantry attack had shattered enemy trench line defenses, exploitation was necessary, and that exploitation required a different kind of tank than did infantry support. So 1940 found the British with two types of tank—one for infantry support, and one for exploitation.

VICKERS MEDIUM I



Crew: 5
Armament: 3-pounder gun, 6 MG
(.303 cal.)

Suspension: Spring
H.p./ton: 7.7 Speed: 15 m.p.h.

CRUISER MK I



Crew: 6
Armament: 2-pounder gun, 3 MG

H.p./ton: 17.5
Speed: 25 m.p.h.

INFANTRY MK I (MATILDA)



Crew: 2
Armament: Machinegun

H.p./ton: 6.4
Speed: 8 m.p.h.

Infantry (I) tanks were slow, heavy, and undergunned—they were all right against machinegun nests and wire in 1918, but in 1940, they were grossly obsolete. *Cruiser* tanks were more mobile, better gunned, but still underpowered. Neither the tanks nor their employment concepts were a match for the panzer *Blitzkrieg*.

LT MK VI B



Crew: 3
Armament: 2 machineguns

Engine: 88 h.p.
H.p./ton: 16.9

CRUISER MK IV



Crew: 4
Armament: 2-pounder, MG

Suspension: Christie
H.p./ton: 23.0 Speed: 30 m.p.h.

United States. The U.S. Army almost totally failed to comprehend the evolutions just described in foreign armies. World War I tank soldiers returned to their first love—horse cavalry—and with few exceptions, that enchanting anachronism absorbed their energies in the years between the wars. Official policy was that tanks were to support infantry. The National Defense Act of 1920 assigned tank proponenty to the Infantry Branch, where tank development languished. Seizing on a provision in the National Defense Act of 1920 that allowed cavalry to have “combat cars,” a few farsighted men began development of the only tanks the U.S. would have by 1940. Generals Adna Chaffee and Daniel Van Voorhis were co-conspirators in this effort. And it was General Chaffee who, from his General Staff

post of responsibility for that part of the Army budget that dealt with tank procurement, siphoned off most of the tank money for cavalry combat cars.

M-1 COMBAT CAR



Crew: 4
Armament: 4 machineguns

H.p./ton: 25.5
Speed: 45 m.p.h.

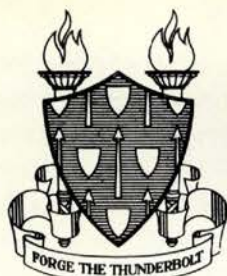
Had it not been for his persistence and farsightedness, the U.S. would have been in an even less desirable posture in 1940 than was actually the case.

Conceived by cavalymen these vehicles featured speed, agility, and mobility, at the expense of gun and armor.

In addition, the military policy of the United States held that a small, austere supported regular army would be expanded by mobilization to meet a crisis. Although not specifically spelled out, the mobilization policy acknowledged a willingness to lose the first few battles of the next war, relying on mobilization of masses of men and equipment to win the last battles and so the war. Even as brilliant a mind as General MacArthur's could not comprehend the urgency of developing new equipment and tactical concepts. During his reign as Chief of Staff, he once observed that tanks became obsolete so quickly that it was quite foolish to buy too many of them. So the U.S. Army approached 1940 with its only tanks in cavalry formations or General Headquarters (GHQ) tank battalions, and no widely held consensus about the combined arms war that was about to engulf it.

D. Maltby

EDITOR'S NOTE: *The design and production of tanks during the World War II period will be discussed in the next issue.*



FORGING THE THUNDERBOLT

CHANGES IN AOAC

Officers now attending the advanced course will find numerous changes when they compare their course to past AOAC courses that have been taught by the Armor School. Not the least important of these changes is the reduction in the length of the course from 38 to 26 weeks with the addition of a second course to begin in January. The change from one to two classes a year has made it possible for the Armor School to reduce the size of each class, allowing for a more individualized course structure.

The Armor School has long recognized that officers attending the advanced course come from a variety of Armor assignments, with backgrounds ranging from officers highly experienced in company/troop command to aviators with little or no Armor/Cavalry unit experience. Recognizing the varied backgrounds of the students, the first three weeks of the advanced course are devoted to diagnostic testing to determine the experience level of each student followed by training for those officers who need to brush up on their basic Armor skills. The diagnostic tests will consist of automotive inspection, maintenance procedures, vehicle recovery, tank gunnery, map reading, and communications/electronics procedures. Classes in these skills will be given to those students who fail to meet the required standards of the diagnostic tests, with the student attending only those classes in which he needs improvement. The initial test and training period will be followed by 2 weeks of mounted tactical training and gunnery. For this phase of training, the student will be assigned as a crew member to either the M-60A1 MBT or the M-551 Armored/Reconnaissance vehicle. Assignment will be based on the student's past experience, with those students with M-60A1 experience being assigned to an M-60A1, and those with Cavalry experience to an M-551. Students will remain together as a crew throughout the field exercise and end this phase of their training by firing Tables I-V.

Continuing an attempt to individualize the advanced course, the Armor School has instituted an

honors program with this year's course. Prior to the beginning of core instruction, students will be given the opportunity, on a voluntary basis, to demonstrate their experience and knowledge by taking an end-of-course examination on selected core subjects. Students passing the core examination will be exempt from those classes and will be allowed to work on programs in military areas of special interest to them.

The Armor Officer Advanced Course may be shorter than in years past; however, the individualized approach will ensure that the Armor School continues to provide the highest quality of instruction possible to its students.

TODAY'S MODERN SOLDIER

He begins basic training with an attitude that is probably more positive than that of any group of men the U.S. Army has received for training since World War II. He enters service with the U.S. Army with a purpose, be it for a job and job training, education opportunities, service, or problems at home.

Basic combat training at the U.S. Army Training Center, Armor contains a sequence of events that not only teaches skills and physically conditions the man, but also inculcates the soldier with discipline and spirit. His training is accomplished in three performance oriented phases: school of the soldier, weapons training, and tactical training. On completion of performance testing and evaluation in subjects which include school of the soldier tests (drill and ceremony, first aid, etc.), rifle marksmanship qualification, physical proficiency tests, tactical knowledge of cover, concealment, teamwork, and suppression, and a military stakes-type final exam, he is ready to move on to his next assignment. Be assured, he is considered to have had sufficient orientation and practical work to be capable of helping plug a perimeter at some future date as a mechanic, cook, or clerk, and he is ready to move on to the greater challenge of AIT.

There are several unique things that happen during the BCT training cycle of today that bear little semblance to years past. The new soldiers' families come from far and wide to participate in "family

day" (normally the fourth weekend of basic training) and in graduation (in the seventh week of BCT). Not only are many families present but also, the relatives, sweethearts, wives and friends, and they sometimes outnumber the trainees present for graduation. Another unique aspect of the completion of basic training is the selection of "winners" for an awards presentation. The most outstanding trainee of each training cycle receives the American Spirit Honor Medal Award and addresses the graduating class with an unedited speech that displays his ability to think and write. We who have been around this Army for many years can feel nothing but pride, admiration, and reward when we hear such consistently fine presentations as the following by PFC Michael E. Lovell of D Company, 15th Battalion, 4th Training Brigade:

General and Mrs. Otis, Colonel and Mrs. Bradley;
Distinguished Guests and Visitors,
Fellow Graduates:

Many years ago, an American poet wrote "When faith is gone, when honor dies, the man is dead." Of no one is this more true than of the "military man." Faith and honor: key concepts I'd like to come back to in just a minute.

I submit that we are not the same individuals who arrived at Fort Knox eight weeks ago.

We've done things here . . . that our mothers would have screamed we'd catch our deaths from, that our drill sergeants have shouted they'd see to it personally—if we didn't. That's the way it started: external motivation with constant supervision.

But gradually (almost imperceptibly), the emphasis shifted to psychological self-discipline: peer supervision and teamwork proved essential because otherwise the job did not get done—which again resulted in consistent *external* motivation.

We are not the same people. Who of us, for example, would ask for directions to a "rest-room;" who, if asked whether he could walk 15 miles with a pack, would . . . shrug his shoulders; or who would dare call his *M-16* rifle a "gun." More seriously though, how many of us, (eight weeks ago) would have confidently treated a person for a sucking chest wound—or shock?

Gentlemen, these are just a few of the components (reflexes resultant of discipline) that go together, to create a motivational *spirit* . . . of confidence and ability.

I say that we have changed. That does not mean that we have forfeited anything. We arrived from different geographic locations, with

as many varied backgrounds, clothing styles, and hair . . . we still have our backgrounds and the clothing we sent home. But, it's like dealing with fractions in grade school; we now have a common denominator; a pervasively unforgettable eight weeks experience. We, here, have been tried and proven . . . not everybody made it. But there is a direct relationship between the stress endured and the pride derived.

Gentlemen, no longer will we be "trainees", but "soldiers"—which brings me to the future, that begins today. The spirit *engrained* within us here, *mirrored* in the uniform we wear, reflects the "faith and honor" conferred by the civilian populace we serve. To me, when the national anthem is played, or when the colors pass in review . . . there is something about a man in uniform, saluting the flag of the United States, that stirs the soul. Ladies and gentlemen, at this time, on behalf of the men of D-15-4, I accept this medal. To the spirit we have as Americans . . . and of America's honor, I say:

"By the grace of God,
this we will defend!"

Thank you.

M-60A1 GUNNERY TIPS

The *M-60A1* is one of the finest tanks in the world today. *It can outshoot any tank in existence*—if its crew understands the basic fundamentals of the *M-60A1* fire control system and ballistic characteristics of the rounds it can fire. Below are some of the more frequent problems encountered in *M-60A1* gunnery and ways of overcoming them.

Frequent Short Rounds

Ranging error by the tank commander is the most common cause of short rounds. Test the tank commander's (TC's) ability to range on targets which have a known tank-to-target range. If the TC is ranging *short*, have him place the rangefinder into operation again to insure there are no mechanical problems with the rangefinder; then have him practice until he can range to within 30 meters of the measured tank-to-target range.

Improper use of the RANGE CORRECTION KNOB is a frequent reason for constant short rounds beyond the zeroing range. The RANGE CORRECTION KNOB compensates for gun tube wear by placing a small constant percentage of superelevation in the fire control system prior to firing. For example,

let's say a gun tube has 200 equivalent full charge (EFC) rounds remaining, and the RANGE CORRECTION KNOB is on O. The gun can be zeroed using the elevation boresight knob to compensate for lower muzzle velocity caused by the worn tube, but this will *not* compensate for the lower muzzle velocity at ranges beyond zero — as the operator's manual (-10 TM) tells you. The *proper* procedure is to index 2 on the RANGE CORRECTION KNOB while boresighting prior to zeroing. This will add a constant 2 percent of superelevation into the system, and with this additional 2 percent to compensate for gun tube wear, the round will now fly to the range indexed into the fire control system.

HEP Gunnery

HEP ammunition has long been cursed as inaccurate, erratic, and worthless against point targets. This can be overcome. Due to its low velocity (2,400 fps), the round drifts to the right and has a large angle of fall. The HEP reticle in the *M-105D* telescope was originally designed for *M-393* HEP ammunition, but the majority of our present ammunition is *M-393A2*. While there are differences in the ballistic characteristics of these rounds, the telescope can still be used with a high degree of success by doing the following:

Zero the telescope by firing HEP, not HEAT or APDS. The telescope compensates for drift, the *M-32* periscope reticle does not. *Remember*, this will provide for great accuracy when firing HEP, but will destroy the APDS zero on the telescope, which is used as a secondary sight for APDS firing. To compensate for this, zero the *M-32* with APDS (or, in training, TPDS-T), refer the telescope reticle to the zero sight picture, and record the elevation and deflection boresight knob settings; return to the *M-32* and fire one HEP round to find the HEP sight picture (this is important because the *M-32* will be used on HEP targets at ranges less than 1,200 meters or greater than 3,200 meters); fire a zero exercise on the telescope with HEP. If HEAT or APDS must be fired from the telescope as a backup sight, the gunner can fire accurately by indexing the pre-recorded zero. (**CAUTION:** The present gunnery tables and CTA's do not provide HEP ammunition for zeroing the telescope. This ammunition will have to be drawn from the allowances for HEP engagements from other tables.)

Use the telescope on all HEP engagements from 1,200 to 3,200 meters. At less than 1,200 meters, the *M-32* can be used with no aimoff and great accuracy. Beyond 3,200 meters, it must be used because the tele-

scope is only graduated to 3,200 meters.

Select the correct sight for long-range HEP gunnery. When using the *M-105* telescope and firing *M-393A2* beyond 2,000 meters, aim slightly above center of mass to compensate for the difference between superelevation requirements of the *M-393* HEP reticle and *M-393A2* ammunition. The same applies when using the *M-32* to fire *M-393A2* ammunition if the HEP cam in the computer is for *M-393*. Between 3,200 meters and 3,900 meters, use the *M-32* with a constant 5-mil left aimoff to compensate for drift and parallax.

Compensate for effects of wind. The HEP round is much more susceptible to wind speed and direction than APDS. Remember this and compensate for it. A good rule is to add 1 mil of aimoff into the wind for each 1,000 meters of range and each 10 miles per hour of wind. *Example:* With the wind from left to right at 20 m.p.h. and the target at 2,000 meters — use telescope aimoff of left 4 mils.

Long-Range Gunnery

Aim slightly to the left to compensate for deflection parallax at long ranges (beyond 2,400 meters) when firing HEAT, APDS, or HEP. After zeroing at 1,200 meters, when you place the *M-32* periscope reticle on an aiming point at 2,400 meters, the gun is actually pointing 22.06 inches to the right of the aiming point. Therefore, a good rule of thumb is to apply 1-mil left aimoff at all targets beyond 2,400 meters when firing HEAT or APDS. Additionally, wind will cause significant drift in HEAT. Apply an additional ½-mil aimoff per 1,000 meters range and wind speed of 10 m.p.h. *Example:* With the wind right to left at 20 m.p.h. and the target at 3,000 meters — use 1-mil left aimoff for parallax and 3-mils right aimoff for wind which equals 2-mils right aimoff.

Turret Problems

For good gunnery, a dedicated turret mechanic is essential. Prior to firing, the turret mechanic and crew should perform a complete synchronization check, and complete a technical inspection of the sighting and fire control equipment. Once the turret is put into shape, the crew must keep it that way! In this regard, neither the rangefinder linkage nor the main gun tube were meant to be a chinning bar for the gunner or a handle for mounting or dismounting the tank!

The M-60A1 is a fine tank and it can achieve rapid target hits if the equipment works and the crew operates it the way it was meant to be operated. Crew training and functional fire control are the keys to effective shooting. □

EVOLUTION AND REVOLUTION IN TANKS

William T. Hunt

Tanks that were introduced to the battlefield in 1916 were the result of compromises both technically and in what their role was thought to be. Failure to appreciate the benefits to be gained by exploiting their inherent capabilities led to relative failure in use.

In the October War, the lessons presumably learned in World War II, as well as previous Arab-Israeli conflicts, were forgotten. The Arabs failed to exploit their early successes and lost the initiative. The Israelis — despite their reputation as masters of tank warfare — apparently forgot that the real secret of mobile warfare is the use of a combined arms team. By committing tanks piecemeal, they nearly lost the war in the early days.

Disagreements between users continue to this day. When Congress killed the *XM-803* tank program,

the cheers of the antimissile men were nearly matched by the moans of those who felt that the lost long-range capability was a tragedy. Tankers around the world — not just in the United States — are still disputing the relative merits of small (and presumably more agile) tanks versus larger, more heavily armored (and presumably less agile) tanks. Now that the development of improved engines and suspensions has made it possible to have heavy tanks with superior mobility, the emphasis on light tank development stems from the anticipated lower cost, resulting from the use of fewer pounds of materials.

Tanks Can Decide Battles

Even though infantrymen can now readily kill tanks, unless discouraged by artillery or enemy infantry, the tank remains the shock element of the

combat action. Despite huge losses of armor on both sides in the October War, the side with the most tanks surviving the initial combat was the one which was able to move on and "win" the conflict. Replacement of tank fleets is still first priority, and we may finally be learning that adequate stocks of tanks are a necessity.

In the world of the blind, the one-eyed man is king and in the world of war, the surviving tank may control the outcome of the battle.

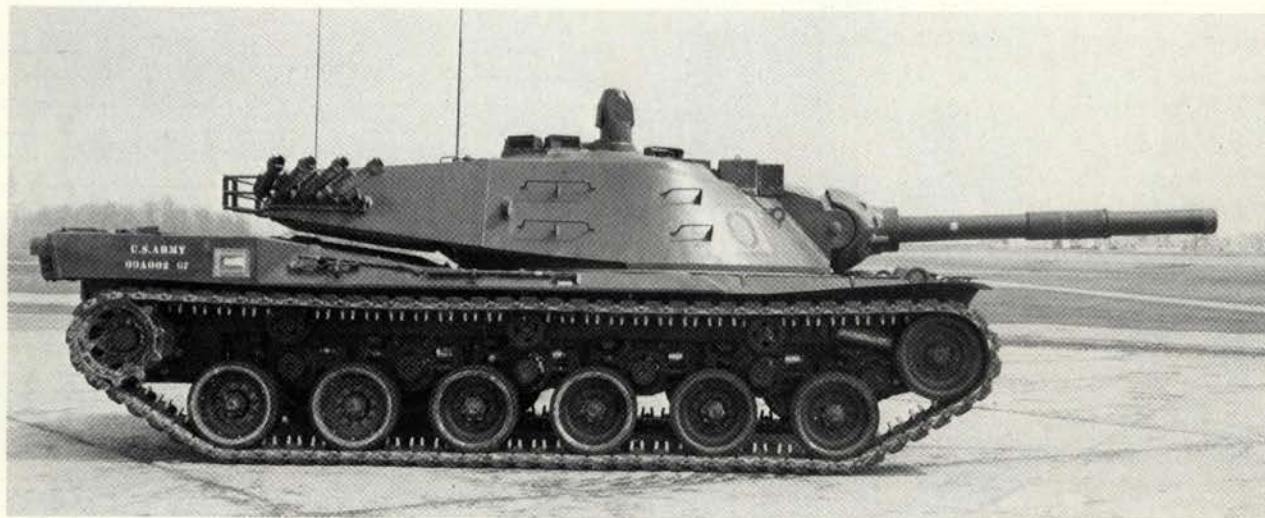
The "chicken-egg" controversy stays with us, as much as we try to hide it. Do industry or arsenal developments spur using forces into finding profitable ways to utilize new technology and weapons, or

several. We give much attention today to "standardization," "low risk," and "modularity." Undeniably these are significant factors to be considered, but it may be unwise to concentrate too completely on them.

Cost Seems All-Important

Cost of acquisition and its step-child "design-to-cost" are prime elements in development today, but who is capable of proving that \$1 million is too much to pay for a new tank while \$5 million is *not* too much for a new airplane?

We still have the considerable segment which maintains we should have lots of simple, cheap



MBT 70/XM-803 — The joint United States-Federal Republic of Germany tank offered many new advances in the state of the art. It fired a kinetic energy projectile as well as the Shillelagh missile, but the complexity of the revolutionary tank resulted in delays and cost overruns which eventually led to congressional action that killed the program.

is the statement of a requirement the driving element which produces inventories and technology?

Improved liaison between developer and user — to keep the latter informed of what can be done — is supposedly a means of consolidating efforts. We still have unsolicited proposals and unforeseen breakthroughs. The "history" of development consistently shows that the hardware does not meet all requirements. Compounding this situation is the understood desire of the user to "push the state-of-the-art," and the need of the developer to have a reasonable chance to meet the expressed needs.

Perhaps the answer will come in some new approach — the use of performance bands not seeming to be the answer. It might pay to have the user assess the potential value of a number of relatively inexpensive prototypes (not just two highly developed items) and combine the desirable features of

tanks rather than smaller quantities of superior vehicles. One wonders if these people are really looking at the probable styles of warfare we are faced with today, rather than those experienced in World War I and II. Would we have time to train enough people properly, let alone produce the hardware?

In supporting new tank programs, careful attention must be paid to regulatory requirements for first examining the product improvement of existing items. A complex, honest analysis is required to determine the true cost and effectiveness aspects vital to a good decision.

World War II tanks are still in operation today in some small countries and may be susceptible to improvement in the more advanced countries. A tank hull doesn't wear out. It can even be expanded in size and altered in shape to accommodate larger

or different components. It is not a simple thing to demonstrate that this is or is not cost effective.

On the other hand, efficiency of operation or breakthroughs in things like armor protection could justify development of new systems. Here again, it is difficult to prove absolutely that the new is affordably superior to the old.

All analyses are subject to second guessing by a variety of people — including concerned citizens, congressional staffers, industry, proponents of other approaches to warfare, disgruntled soldiers (whose ideas have been ignored or abandoned), and professional sensationalists.

Development and Improvement

At the present time, the Army is trying to carry out a balanced program which embodies many elements of technical and cost compromise, tries to satisfy many individuals and pressure groups, and attempts to provide the most effective total capability for the available money. This program not only includes development of a new tank — the *XM-1* — but significant improvements to the current *M-60*-series tanks and even to their predecessors — the *M-48* series.

The *XM-1* tank was initiated after the demise of the US/FRG *MBT-70* and its follow-on, the *XM-803*. The Army attempted to provide performance requirements for a new tank in a rational, comprehensive manner — even including comparisons with improved versions of the *M-60*.

User, trainer, and developer participated in a task force in 1972 to accomplish this, and utilized total Army resources to do so. Not only were the benefits of existing and impending technology thoroughly assessed, but the many facets of battlefield employment were investigated. The difficult art of cost estimation was a major factor in their deliberations, as were the results of many war games and tactical simulations of various conceptual designs and force structures.

XM-1—Fewer Firm Requirements

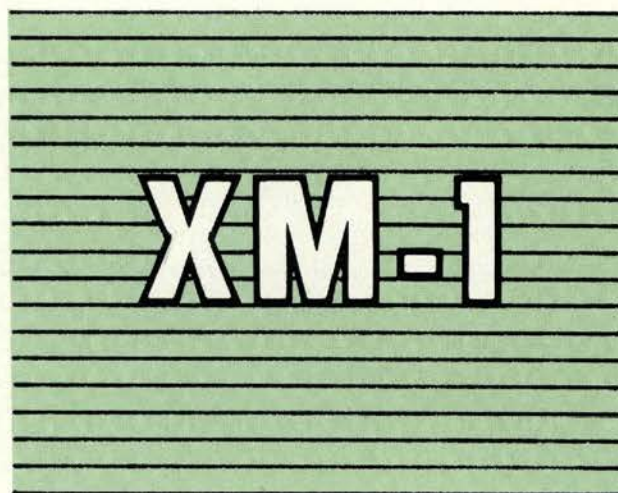
Out of this effort came the requirements for the *XM-1*. Perhaps the most significant thing is that firm requirements were established only in cost, protection and reliability/availability/maintainability, and durability (RAM-D). Although many performance bands were provided as goals, their accomplishment was to be insured only by competitive validation prototyping and the assurance that a production program could result only if there would be

a significant improvement in performance over existing tanks.

During the initial validation phase, two contractors — General Motors and Chrysler — are competing. To prevent unrestricted weight growth with the improved armor protection required, the project manager has imposed a weight limitation of 58 tons.

Early indications are that, without this limitation, both contractors might have increased weight to 65 tons or more, instead of using their ingenuity to hold the line.

Once you have passed 53 tons many inhibitions are no longer significant and it is difficult to identify important tactical reasons for not allowing such a growth in this range. However, it appears that



cost, mobility, and possibly some future considerations, make it highly desirable to restrict total weight to a reasonable figure.

Vulnerability considerations, especially those associated with detection and target dimensions, further dictate a low silhouette. It is unfortunate that adjustable height features are not being considered because of congressional ridicule of the "squatting" capability of the *MBT-70/XM-803*. It is regrettable and distressing that emotional outbursts — often based on incomplete knowledge — can have such an adverse effect on our combat potential.

Superior Mobility

The competitive nature of the prototype validation phase has allowed the contractors to select many different components and designs. For example, Chrysler is proposing a gas turbine engine, whereas General Motors is planning to use a more conventional diesel engine, but with advanced features. Both result in nearly doubling the power-to-weight

ratio over existing tanks and, in concert with improved suspensions, provide for increased cross-country speed and overall agility.

The markedly improved acceleration of the higher horsepower power plants, coupled with this increased mobility, means less exposure time in combat and thus greater survivability.

Perhaps the greatest improvement of all is the markedly superior armor protection which is the result of many years of effort by the Army, particularly by the Ballistic Research Laboratory. When this is combined with system design techniques for compartmentalization of combustibles, such as ammunition, outstanding reductions in vulnerability may be achieved.

Improved Firepower

Effectiveness of the main armament is being enhanced by the development of new ammunition. Developments in sabot technology and penetrators realized in the preceding tank programs are being exploited for the *XM-1*. Fire control, night vision, and stabilization developments provide for higher hit probabilities to match the effectiveness of the new ammunition, but exact configurations in these areas may ultimately be controlled as much by cost limitations as by technology.

In the interest of possible standardization of tank main armament, a tripartite evaluation is currently being conducted. The 105-mm gun, a new British 110-mm gun and the new German 120-mm gun, each with new ammunition, are the candidates being tested. Until the evaluation is complete and national considerations examined, it will not be known whether a common gun can be adopted.

M-60 Series Improvement

Since the overall allocation of national resources will provide a limit on the number of new tanks to be produced, it is essential that the Army do its utmost to improve existing tanks.

The *M-60A1*, in production since 1962, has been improved in varying degrees throughout its life. Things like an add-on stabilization system, top-loading air cleaner, a new electrical system (with greater power and reliability) and a more reliable engine are already in production.

A laser rangefinder and solid state computer have been tested. The rangefinder will permit either the gunner or commander to range quickly and with extreme accuracy. This precise range is fed automatically to the new computer and the gun is

M-60



M-60A1



M-60A1E3



M-60A2



positioned without the need for resighting. The computer is of solid state construction for reliability and accuracy. It also utilizes the information provided by sensors for vehicle cant, ammunition temperature, and crosswind along with corrections for lead and tube wear to substantially improve long-range hit capabilities.

Further improvements in the works are a high mobility (tube-over-bar) suspension for increased cross-country speed, a new cupola to reduce overall height of the tank, an improved long-life track with replaceable pads, and side skirts. The Army is looking at additional changes such as a small, protected searchlight, thermal imaging night vision devices and, for ultimate improvement, perhaps even a new turret utilizing advances in armor technology.

Even further down the road, we may see totally new guns, smaller and with new solid or liquid propellants, and exotic sensing and sighting devices. Such developments are in research phases today and are being watched by many Army elements, even though it will be years before they can be adopted.

Lessons Learned

Experiences of the October War are being thoroughly reviewed by both user and developer for impact on both new designs and product improvements.

The new *M-60* cupola and a more fire-resistant hydraulic fluid were early results. Provisions for additional ammunition stowage, armoring of air cleaners, and improved machineguns are among the many possible changes being addressed. For the *XM-1*, a special study group was convened to consider these questions in a structured manner which may lead to changes in the requirements document. For the *M-60A3*, still another formally constituted group is performing a cost and effectiveness analysis of the fire control improvements.

Camouflage is also coming. Not only are paint colors and patterns being prepared, but other aspects of vehicle signature are being addressed. Special radar absorbent materials and a variety of covering nets are in prospect. Efforts also are underway to counteract acoustic, electromagnetic, heat, smoke, and other effluent signatures.

We are also upgrading *M-48*-series tanks by dieselization (*A1*'s and *A2*'s) and upgunning with the 105-mm gun and the *M-60*-type fire control. American industry is already heavily involved in improvement of current and older (*M-47*) tanks in foreign countries.

At Last, The M-60A2

The *M-60A2* — whose 152-mm gun/launcher fires both conventional ammunition and the *Shillelagh* missile — is also being deployed, many years behind the original schedule. If we have learned the maintenance lessons we should have from our experience with the *M-551 Sheridan* reconnaissance vehicle, and if our school and field training is as good as we know it has to be, the *M-60A2* should be a successful vehicle. Only combat experience can settle the gun-missile controversy, however.

With regard to the *M-551*, the principal lesson we should have learned is that a big weapon should not be mounted on so light a vehicle. The presumed lesson that the *M-551* is too complex is not a valid design lesson. All our systems are of necessity becoming more complex, and the Army must adjust to that situation, not take steps backward, and field inferior equipment just because it is easier to maintain by outmoded methods and men.

The total tank development-improvement-retrofit program will benefit our armored forces, yet stay within constraints imposed by Congress. If allowed to proceed as contemplated, the program will do much to provide equipment superior to that now fielded or planned by potential adversaries.

At least we seem to agree that the tank is essential on the battlefield of the future, even perhaps beyond the year 2000. It remains to carry out the further development of integrated tactics — the combined arms principle — while monitoring closely all new antitank threats.

Sober, thoughtful assessment of the role of the tank and its relationship to present and future threats is absolutely essential if we are to avoid the emotional decisions which have led to the fall in battle of many great countries.



WILLIAM T. HUNT has an extensive background in tank development for industry and the U.S. Army. Mr. Hunt's federal service began in 1963. Since then he has worked on the *Sheridan/Shillelagh* project and served as Project Manager Staff Officer for that system. Mr. Hunt is currently the Chief of the Vehicle Branch at the Army Materiel Command's Research, Development, and Engineering Directorate.

Pages from the Past

REVOLVER CONSIDERED USELESS

It may be safely asserted that the revolver is not much in favor with cavalry officers; and it is unfortunately true that their dislikes are only too well founded. The reason is not far to seek: real proficiency with any firearm is impossible without the expenditure of a good deal of time, money, and ingenuity, and the revolver has been, and still is, the most neglected of our firearms, never having received a tithe of the attention lavished upon the rifle by the cavalry and infantry, or upon their own weapons by the artillery.

I have often heard cavalry officers assert that the revolver is almost valueless for mounted use; and the annual exhibition by gun-shy horses and untrained shots only tends to confirm them in that belief.

On the other hand, few will be found to deny the value of the revolver in the hands of a "Buffalo Bill" who can make a practical certainty of hitting his man, at a dozen yards distance, when riding at any pace.

Cavalry Journal
September 1910

MANEUVER DAMAGE

Anent the autumn maneuvers, which are gaining ground in our army, an important factor not brought out in the official reports is the subject of a report to the Chicago Times of February 4, 1904:

"From the Smoky Hill basin to the Republican River, and up and down the Kansas River banks, there is rejoicing in Kansas. Congress

has appropriated money to pay the farmers for their pullets and old hens.

"When the army maneuvers ended October 27th, this section of the State was eggless and chickenless. The casualties of the campaign of the Blues against the Browns had been 84,000 hens and late autumn 'spring fries.'

"Now hope springs anew in the agricultural breast, since Congress has appropriated \$2,100 to pay for the damage done last year by soldiers and \$5,900 for additional loss which will be sustained (it is hoped) by the farmers at the next maneuvers.

"Everybody is preparing to raise chickens. Incubator agents are arriving at Junction City on every train. Farmers are preparing to fill their fields with chicken coops, built without doors. Every opportunity will be given the soldiers next summer to rob hen roosts without trouble.


"In the annals of the Fort Riley engagement as officially recorded, it will not be mentioned that the decisive engagement of the Browns against the Blues was lost because of chickens. The twenty-eighth mountain battery had been ordered to the support of the First Kansas, then hard pressed, and in taking position the battery came across an untouched chicken farm.

"The First Kansas was left to its fate, and Major William H. Coffin, commanding the divisional artillery from the timberland back of the Smoky Hill, saw through his field glasses a carnage he could not stop.

"These chickens were accountable for the decimation of Colonel Metcalf's fine regiment of Kansas infantry, and the day was lost."

Cavalry Journal
February 1904





TANK GUNNERY UNDER FIRE

by Lieutenant Colonel Charles E. Honoré

In 1962, I was the commander of an armor company in the 3d "Marne" Infantry Division. Looking back, I can still vividly recall one of my tank commanders cradling his machinegun in his arms and asking it why it had failed to fire during that crucial time in his career. He was crying. I was no less upset because I was "betting my commission" that his crew and the others to follow would qualify.

Nineteen hundred seventy three found me back in the "Marne" Division. Now, I was the commander of an armor battalion. My battalion participated in two qualification gunnery periods. The first, in June and July of 1974, appeared to be much like my first experience 12 years earlier. However, when my unit joined the other battalions of the 64th Armor Regiment at Grafenwoehr in January and February of 1975, we were no longer "betting our commissions." We were the first units in USAREUR to fire the revised Table VIII (Range 80) for qualification. Therein lies the purpose of this article; to report my observations of the changes that occurred in tank gunnery conducted by the 7th Army Training Center

and the "Marne" Division.

A Table VIII range should enhance and accomplish crew proficiency. That is, teach the crew to shoot fast and accurately. Realism, in terms of duplicating a battlefield environment, is necessary, but not at the price of detracting from crew gunnery. Certainly, tank crews should ultimately be able to function offensively and defensively using sound tactical formations with gunnery techniques integrated before they are fully capable of accomplishing their mission. However, the Table VIII range, specifically Range 80, Grafenwoehr, should not be bastardized to the point where we are mixing gunnery with tactics so as not to fully accomplish either objective during the short time we are on the range.

We were the first unit in USAREUR to test the improved Range 80 at Grafenwoehr during qualification firing with both three- and four-man crews. For the first time, we used battlesight engagements, fired long-range engagement, fired the training-practice-discarding-sabot (TPDS-T) round, and exercised the option of firing one- or two-round engage-

ments. These and other improvements, such as defilade positions and realistic targets, provided the tank crews with much better training than had been previously experienced. However, care must be taken to insure that too many innovations are not made in tank ranges, and that our purpose for being there — training — is not compromised. The following will point out what was good tank training and what wasn't, and what impacted on tank gunnery one way or the other from the viewpoint of an ex-battalion commander.

Range Scheduling and Operation

Much has been said about decentralization of range operation, that is, to let the battalion commander run all ranges, including Table VIII. The "Marne" Division decided that since the changes in the range configuration would still be taking place upon our arrival and since the complications inherent in setting up a qualification course for the tanks with add-on-stabilization (AOS) would be an additional problem, the qualification range (Table VIII) would be run by a division range packet. Firing battalions would run all other ranges. Training was emphasized and crews failing to attain a combat-ready rating on their initial run would be permitted to renegotiate the course, providing range time and ammunition were available. This is the way it should be; a tank battalion should not be required to set up and operate the final qualification course; it doesn't have the assets to do it right, considering that when the first company arrives on Table VIII, there are other companies firing Table VII and possibly Table VI. To ask a tank battalion to operate Table VI, VII, and VIII at the same time is asking too much and detracts from the type of training that can be accomplished. Table VII should be run by a battalion team to free the company officers to train their crews and work with their platoons, instead of sitting in a tower most of the time. So giving the battalion commander a mission-type order to do his gunnery is asking him to do more than is reasonable to expect.

January is not an optimum month for gunnery. The days are short and the nights are too prone to fogging in quite early. Given his individual range schedule, the battalion commander spends 3 weeks fighting to get on a range ahead of his assigned date and fighting equally as hard to stay on that range for "just one more day" because he has spent the last 3 nights on "fog watch." If the organization breaks down for 1 day, or the moving target falls

off the tracks, or the weather is unfavorable; the end result is rushed, poor training and dog-tired crews who are not getting anything out of the little training they are receiving. The point to be made is that scheduling of ranges and tables is too often based on the optimum. Additional range time must be allocated to the battalions, to compensate for the unexpected.

It is conceivable that a company could spend 3 days on the Table IV zero complex getting a sure zero on all weapons and then move directly to Table VII for 7 days of concentrated gunnery/crew training. Conceivable, but not practical. However, Tables IV-VI could be considerably shortened and revised to give the unit the extra time desired on VII. There is no sense in four stationary "runs" on Table IV. Once a zero is established, all that is really needed is one run to verify. Spending 2 days and nights shooting at stationary white sheets is a waste of time and ammunition. However, the concept of Table IV could be changed to make it more worthwhile.

Table V does have a great bearing on a crew's performance on Table VIII, and is good gunnery training. If the train does not fall off the tracks too often, or the two far berms do not fog in too early, the table is not a great time consumer. We should retain it. If we ever have to go to war, most of our targets will be moving anyway.

Table VI provides an excellent test firing of the machineguns. We fired one run on Table VI wearing protective masks. This is an opportune time to test the gas particulate units, find out how many you have, if they are operative and if the crews can function wearing protective masks.

We should save as many days and as much ammunition as possible on Tables IV-VI and use them on Tables VII and VIII. Use every minute of time available, but aim for the maximum amount of effective training in that minute. Rotate the crews during the day and night periods so they get a chance to sleep — and not just on the floor of the turret waiting to go downrange. Instead of 2 day runs on Table VII, make it 3 or hopefully 4 runs. This is the range where the most meaningful training is conducted.

The New Scoring System

For a new scoring system, there were surprisingly few problems. It is still in the process of evolution, but in its raw form, it is still superior to the old system. In the past, the opening times were far too

lenient, and if viewed as training for combat, the latest experience from the field has proven that speed is one of the keys to survival. The crews were required to beat the clock as well as the target, and those who could accomplish the latter and not the former failed to qualify. In view of this, we altered the scoring of Tables IV-VI. The old scoring system was scrapped because it was tied to the old qualification system, and a new method, using a sliding scale adjusted separately to each table, was devised. The objective was to obtain both speed and accuracy, and to begin instilling the need for "quick kill" into the crews as soon as possible. The

The new qualification system should be retained, because it is realistic and requires the tank commander to make a decision he might well have to make while engaging multiple targets in combat.

system itself resulted in far lower scores on the lower tables than would have been obtained under the old system, but it was more consistent with Table VIII and better prepared the crews for it. Besides, scoring on the lower tables means little, it's the training that counts.

Another new feature, under the revised system, was the TARGET CEASE FIRE and bonus points for achieving a first-round hit and bringing the second round back to the start line. The tank commanders were briefed to fire the first round as soon as possible (ASAP), but then not to fire the second round if the first round looked as if it was a hit. It was drilled into them on Table VII and it looked good until the qualification run and the "Range-80 Jitters" took their toll. It is difficult to sense a target hit through the smoke and blast, especially with HEAT and, when this difficulty was added to the pressures of qualification, the results were not always good. However, this system should be retained because it is realistic and requires the tank commander to make a decision he might well have to make while engaging multiple targets in combat.

Before the last tank in the division had crossed the start line, the hue and cry could be heard everywhere. "The course is too hard!" "The qualifying percentage is set too high!"

A representative sampling of scores from June was compared to the sliding point scale used in January and, although the points needed to qualify now equaled the same percentage as a distinguished score

in the past, there are more points available. The two systems actually compared very closely when using the same score sheet. The key to qualifying still remains a good first-round time and a first-round hit — which is also the key to survival on the battlefield.

Battlesight Engagements

For the first time, we fired battlesight engagements. In the past, battlesight gunnery was something that was always included in the tactical SOP's, but never practiced. We should retain this system of firing because it is an integral part of combat gunnery, and the high percentage of hits attained shows that it does work, but not the way TC 17-12-3 describes. The new "doctrine" calls for aiming at the base of the target where it appears to touch the ground, and if the first round does not hit, it will be short and easily adjusted. However, when the target is slightly above the firing tank — as on Range 80 at Grafenwoehr — firing low will consistently end in a round in the dirt. The aiming point that met with the most success was on the front slope, just below the turret ring.

SABOT Gunnery: The Invisible Round

SABOT gunnery was badly needed, and should definitely be included in all future qualification courses. Only a very few gunners in the battalion had previously fired the round, and this is the round that is billed as the main tank killer on the battlefield. The immediate problem was how to properly engage a moving target with the round and hit it. The round was too fast to be sensed from the turret; by the time the blast and smoke had dissipated, the round had long since hit or missed the target. The gunners had to train sufficiently with SABOT to know exactly where to place the crosshairs for a target hit, but there was only a small amount of ammunition to train with.

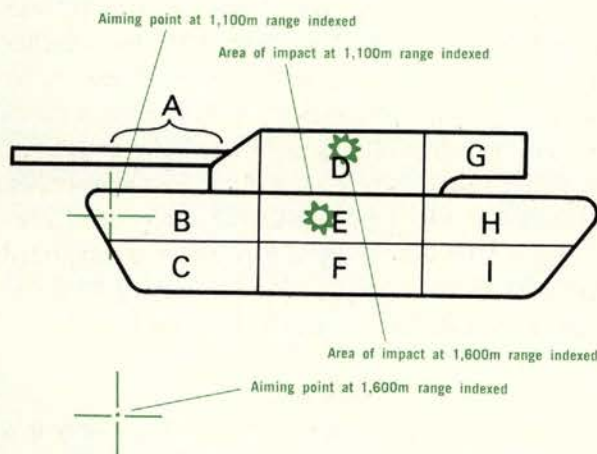
First, a basic assumption had to be made. Due to the velocity and accuracy of the round, if the crosshairs were placed on the same spot on the target and two rounds were fired, they should both impact in the same area. Since it was impossible to sense the round, the decision was made to train for a first-round hit and under no circumstances fire a second round. It was to be a one shot, hit-or-miss proposition.

The second problem was where to put the aiming point and with what battlesight range setting? There was no data to draw on, and no ammunition to ex-

periment with. The third obstacle was the gunner. He had a total of four rounds to fire prior to qualification, had to have a firm sight picture in his mind and know where the round would hit.

These problems were resolved using the training aid shown in Figure 1. On Table VII, both the tank crew evaluator (TCE) on the tank and the scoring personnel in the bunker had a copy of the diagram. The gunner would fire one — and only one — round of SABOT per run.

Figure 1. APDS Scoring Sheet.



When he returned for the debriefing, he would point out to the TCE where he placed his crosshairs on the moving target, and the bunker personnel would call back the target hit using the letter designator of the area. When both were recorded on the diagram, the gunner knew exactly where the round was striking. By entering the range setting at the bottom and retaining copies of the diagram, it was evident by the end of the first day that the setting recommended in TC 17-12-3 would not work. With the suggested range of 1,600 meters indexed and firing at a moving target only 1,000-1,100 meters away, the aiming point had to be ahead of the target and well into the dirt. Even with such a drastic shift, the rounds were still impacting high; most of them directly on the turret. This was unacceptable for two reasons. First, the gunner was not actually leading the tank, but rather placing his crosshairs on the ground in abstract relation to the tank. Second, with target hits in the turret, the larger percentage of the target — the hull — was not being touched and to bring the aiming point down far enough to get hull hits placed it too far off the target for a consistent lead.

It was at this point, after controlled experimenta-

tion, that the battlesight range index was dropped down to 1,100 meters. With this range the gunner could apply more correct target-lead techniques and the rounds would impact in the hull, giving a better percentage of target hits due to increased target area. Using the technique described earlier, each gunner then found the aiming point that was best for him and his tank. The results achieved on Table VIII justified the procedures. Figure 1 depicts the aiming points and impact areas that resulted from the experiment.

The 1,800-Meter Target and Improper Ranging

There was much talk of the extended ranges of the precision engagement on Table VIII and how they provided better training, that is true; however, the crews did not get enough practice at shooting at long-range targets on the lower tables. If the qualification range is to include targets out to 1,800 meters and beyond, then the earlier tables, in particular Table VII, **must** include longer range targets. A far-off target requires both a precision lay and even more precise ranging. At 1,200 meters, neither has to be perfect in order to get a hit, and when the crew fires out to 1,800 meters on Table VIII and uses the same essentially sloppy techniques that had worked so well over the past 3 weeks at lesser ranges, the result is a miss. One would not dream of sending a basic trainee out to the *M-16* qualification range with 300-meter targets without spending numerous days beforehand practicing at that range. The same should be true for the tanker.

Ranging by the tank commander was especially critical. It is imperative that home-station training include a surveyed ranging course with exact ranges to targets from multiple firing points. Good ranging is an exacting science that requires a great deal of repetition to perfect. Old tankers say that after the images come together, add a half twist, or add 100 meters etc. — and they are not wrong. Across the board, the HEP and tank commander engagements were continuously **SHORT LINE**.

The Death of the Crew Cut List

This year, unlike others, the crew cut list was reduced from volumes to less than a dozen items. The rationale given was that it did not really matter what the crew did inside the turret, or what their methods were, as long as their methods worked and they could destroy the target. The old crew cut system was a pain primarily because of the nit-picky

way it was carried out, but there is still a very real place for crew cut-scoring in a crew qualification. There must be a set standard applicable to all crews within a unit, so a man could get out of his tank and into another and begin functioning immediately. Crew cuts are not a hassle. They are a way of enforcing the proper methods of gunnery and crew drill, and if you find a crew that consistently commits crew errors, whether they are scored or not, you will usually find a crew that is disorganized and prone to confusion, and that habitually has slower opening times. When a crew cut is not enforced, it is difficult to convince the tankers that their own brand of shortcut is not the better way.

The Three-and-One-Half-Man Crew

To train as many tank commander-gunner combinations as possible, and to exercise as much equipment as possible, without putting cooks and mechanics in the turrets, the "Marne" Division concept was to rotate drivers or loaders, allowing one crewman to function in two tank crews as long as both crews were in the same platoon. This was done to allow the nontankers, i.e., cooks and mechanics, to continue to function in their intended roles as they would do in the event of mobilization, and to train crews that could accept the fourth man upon mobilization. This system worked remarkably well and should be considered by all units that are manned below their required strength.

The Three-Man Crew

When tasked by the division commander to fire one company of three-man crews to determine how much less effective they are than four-man crews, we attacked the problem with enthusiasm and curiosity. If we were to train three-man crews (with a substitute fourth man) capable of accepting the fourth man upon mobilization, then it is only logical that we should have some idea of what to expect of the three men in combat until the fourth man arrives. We tested the three-man crews by comparing their performance to that of the four-man crew companies. If performance on Table VIII (Range 80, Grafenwoehr) is a true indicator of combat effectiveness, then the three-man crews would be much more effective than we, most tankers, had expected.

Their overall scores were in the top 50 percent of all the qualifying crew scores in the division, but, as expected, the areas in which they were inferior were important to survival in combat. By eliminating

the gunner and the necessity for tank commander-gunner teamwork, the critical factor then becomes the development of the TC's skill in manipulating the tank commander's override. The three-man crews had slightly fewer first-round hits, less success on adjusting after a first-round miss, and were a little slower in getting off the first round in daytime. In three-man crew gunnery, the tank commander must develop in himself the skills normally shared by the TC and gunner; in combat, the TC would have to accomplish this under extremely difficult conditions. If Table VIII is a test of crew gunnery skills, and we think it is, then by hours of practice the TC can equip himself to do well on Table VIII, but whether or not he would do as well in combat cannot be tested. It is apparent that TC's of three-man crews are not capable of engaging multiple targets or acquiring single targets as well as four-man crews. Nevertheless, the performance of three-man crews on Table VIII was so much better than we expected that further study on the use and training of three-man crews certainly appears to be feasible.

Summary

What has recently happened in tank gunnery is a giant step in the right direction. Obviously what has been written and said in recent times about the necessity of revising our thinking on tank gunnery has achieved some success. We have much more to do. For example, Table IX and Table X for section and platoon battle runs will be most welcomed to get us started working on distribution-of-fire problems. Engagement of multiple targets should continue to be explored.

Whatever the final arrangement for gunnery turns out to be, it should be developed with training in the forefront. Let us never go back to those days when you were "betting your commission" on how many tanks you could qualify.



LTC CHARLES E. HONORÉ was commissioned in 1956 through the ROTC program. He has commanded both a tank company and a tank battalion in the 3d Infantry Division in Germany. Colonel Honoré commanded the 2d Battalion, 64th Armor prior to his present assignment as Chief of Staff, Schweinfurt Military Community.

The latch lets go and the TC's hatch comes down on your head . . . Felt is soft and hatches are hard.



Beyond the BLACK BERET

Once upon a time in the U.S. Army, personnel in armored units wore the same type of headgear as any other soldier. They wore service or garrison caps with class A uniforms, field or pile caps with class C uniforms, and steel or CVC helmets with class D uniforms. People yawned and got up for Reveille, worried about command maintenance management inspections (CMMI's) and tank crew qualification course (TCQC), yawned and went to sleep at Taps. Then came the revolution!

Now, personnel in armored units wear black berets — unless they're in a Cavalry unit, where they wear black stetsons when they're not wearing berets — unless it's an Air Cavalry unit which doesn't wear berets — however, if it's the 1st Squadron, 17th Cavalry, they're probably wearing maroon berets, not Stetsons, because they're organic to an airborne division — unless they wear something else around aircraft as a safety measure! Nowadays, the only people who wear the baseball cap seem to be poor Snuffy, the basic straightleg, and post odds and ends. Special Forces, who are *not* mollified by the sincerest form of flattery, are becoming increasingly harder to deal with on a professional basis — and it doesn't help when we call them Girl Scouts, either!

So, the question still remains: why should armor soldiers wear a black beret? And the answer is not as simple as it seems.

Black berets, being a distinctive item of uniform are, to a degree, a booster of *esprit de corps* and an aid to recruiting/retention of motivated personnel. A beret has no brim to catch on protruding objects, such as charging handles and overrides when climbing in and out of tank turrets. It can be rolled up and tucked in the cargo pocket of your field pants, shoved under the shoulder loop of your field jacket or pushed into your briefcase, and come out unaffected. The wind doesn't whip it off your head and earphones go right over it. Black berets are used by the armored forces of many other nations, so its universality appeals to many.

However: Once you start running around in the hot sun at Fort Hood in July, you may notice the sun is a lot brighter than it used to be. You may also notice that the tips of your ears start to sunburn to the point that they look like two pieces of bacon. As the sun gets hotter, you may notice that your head is perspiring inside its felt covering and that the leather sweatband seems to be getting tighter. When you get back to your quarters, you find a well defined red ring across your forehead. Ouch!

It is now November. You are running a field training exercise (FTX) out in the woods of Fort Knox. As you attempt to ground guide your tank into its laager position in the gathering twilight, the rain pours down your face, obscuring your vision. Your driver misunderstands your gesture of wiping your face, pivots, and takes the left fender off on an inconvenient tree. Report of Survey! As you stand there fuming, you notice that felt soaks up water like a sponge. Achoo! Cold tablet sales are booming, and the terpin hydrate is passed from hand to hand. Berets, anyone?

It is one hour before dawn. You mount up and stand to. Since money is tight, you put on the headset over your beret because you can't get a combat vehicle crewman's (CVC) helmet. When the sun comes up, you move out. The latch lets go and the TC's hatch comes down on your head. That's all you remember, as you come to one week later in the hospital. The doctor says that you're lucky. The last three TC's that he treated will spend the rest of their lives as walking vegetables in some VA hospital. Felt is soft and hatches are hard.

It is true that many countries issue berets to their armored forces. But in some ways, they also are miles ahead of us in uniforms for tankers. They have coveralls. The Russians, who know full well the results of windchill and hypothermia, issue one-piece leather suits for winter use. The Germans, no slouches when it comes to tanking, issue a coverall that is flame-retardant,

water-repellant, long-wearing, and fitted with a built-in handle to aid in removing injured crewmen from the vehicle. By comparison, what do we have? Starched fatigues! When we climb in and out of a turret — especially if wearing winter clothing or web gear — we emulate the Scot who invented the limbo to get into the pay toilet! Several years ago, the Army research facility in Natick, MA, was testing coveralls similar to the German ones. Where are they now? I'd rather pay \$40 for a suit of coveralls to wear in the field than have a carload of berets, knowing that the coveralls could save my life in the event of an accident or fire. Not only are coveralls distinctive, they are traditional. Look at the pictures of our tankers during World War II and what are they wearing? Patton, Grow, Wood, Rose, and Harmon — they all wore coveralls at one time or another. Nobody ever called those generals unmilitary looking!

Another traditional garment of American tankers that went out with coveralls was the tanker jacket and overalls. Now, people who want tanker jackets, where and when they are locally authorized, have to buy their own. I remember well my days in the 2d Squadron, 10th Cavalry, in Korea, when we all had tanker jackets which were locally made and covertly worn, under orders to put a field jacket or parka on over them when division staff members were apt to be in the area. Not only were these jackets warm, comfortable and lightweight, but they provided the right pockets in the right places without getting in the way, even in the rather cramped cupola of an M-48A2C. By comparison, the issue M-51 or M-62 field jacket either snagged its lower hem on the charging hook of the .50 caliber, or the bottom of the left breast pocket became enmeshed with the eyepiece of the T.C.'s periscope. Truly, tanks demand clothing compatible with their interiors. And since only armored troops could wear them, *issue* tanker jackets would become *ipso facto*, distinctive items of uniform.

Since the question of tradition is al-

ways raised when uniform changes are proposed, it might be interesting to route a staff study on the feasibility of wearing black berets through Fiddler's Green for comments. Based upon what historians and biographers have told us about the residents of that last permanent change of station (PCS) for cavalrymen, we would probably receive comments such as:

"Anything not mission essential is dead weight." — Ghengis Khan

"The purpose of any device on a knight's helm is to identify him, not to make him merge into the rabble." — Richard I ("The Lion-Hearted")

"We had the Kossuth hat to honor the Hungarians and the Kepi to honor the French. After the Franco-Prussian War, we got dress helmets like the Germans. Who are we trying to look like with these artist hats?" — LTG Phillip Sheridan

"Take it from one who knows. Fancy hats draw fire!" — LTG J.E.B. Stuart

"It was the crowning achievement of my career to command an army that was unmistakably American. Why don't you people want to belong to such an army?" — GEN John J. Pershing

"For three years I had to fight that Limey sonofabitch Montgomery for every man, tank, and drop of gasoline I needed. Now my own Army wants to wear funny hats like him!" — GEN George S. Patton, Jr.

By this time, you have probably decided that I am antiberet. This is not so; I belong to a Cavalry Squadron where it is mandatory to wear one, and I do so gladly. But, like any piece of equipment, it has its limitations. I would like to see a uniform for Armor and Cavalry units which is distinctive, practical, and unmistakably American. I cannot conceive of just what the headgear would be, but I'm sure there is something, somewhere that fills the bill. Until then, I shall continue to wear my black beret.

— Captain Peter M. Lloyd
Armor, MASSARNG

short! over! lost! OR ... **TARGET** ⊕

PERSHING FOR NORMANDY:

An Ordnance Myth

by Captain Charles H. Bailey

On these pages some 25 years ago, Colonel Joseph M. Colby expressed the opinion that, but for bitter opposition to its development, the *T-26 Pershing* tank would have been available for the Allied landings at Normandy. This view received scholarly support by the three histories of the Ordnance Department, published by the Army. In the last of those volumes, *On Beachhead and Battlefront*, Lida Mayo claims that the record supports Colby's conclusion and says that the opposition came from Army Ground Forces (AGF). The acceptance and persistence of the view presented by Mayo is illustrated by the concluding comments in Captain James D. Brown's article, "Medium Tank Doctrine — The Sherman Era," (*ARMOR*, November-December 1973). However, the thesis that interference from AGF and its commander, Lieutenant General Lesley J. McNair, delayed the arrival of the *T-26* on the battlefield is not true. The *Pershing* did not arrive at the front before 1945 because the Ordnance Department could not manage to develop or produce the tank any faster than it actually did. McNair never interfered with the development of the *T-26*, and his opposition to the tank's production was overruled before the tank had reached prototype stage. The onus of blame for the belated arrival of the *T-26* in Europe during the closing days of the war against Germany has lain on McNair and AGF for far too long.

The *Pershing* was only one version of the Ord-

nance Department's *T-20* series of developmental tanks. A demonstration of the first prototype of the series, the *T-20*, impressed Generals George C. Marshall, Brehon B. Somervell, Commander of the Army Service Forces (ASF), and McNair enough to allow approval of 250 *T-23*'s as production pilots. Engineering studies had convinced Ordnance that it would be possible to mount 90-mm guns on the *T-23* in lieu of the 76-mm guns envisaged. Ordnance's proposal to produce 50 of the more heavily armed tanks was approved by ASF on 24 May 1943 with concurrence from AGF. The *T-23* with the 90-mm gun was redesignated the *T-25*, and an initial production of 40 was authorized. Ten pilot models of an even more heavily armored version, the *T-26*, were also approved.

The first dispute between the Ordnance Department and AGF over the *T-20* series was fomented unintentionally in July 1943 by Major General John K. Christmas, Chief of the Tank-Automotive Command, when he requested authorization for production of 50 more *T-23*'s. General Christmas' engineers had abandoned the *T-23*'s electric drive for use in the *T-25* and *T-26* because of the transmission's excessive weight. The request for more *T-23*'s was intended to use the electric transmission already ordered. Before AGF could reply to this idea, they received a feeler from Major General Gladeon M. Barnes, Chief of Research and Development (R&D) for the Ordnance Department, to gauge their reaction

to a possible proposal for production of 500 additional *T-23*'s and 500 *T-20E3*'s (torquomatic transmission). Barnes admitted that he could not choose between the two tanks because they were not sufficiently developed. The Ordnance Department would apply the total production to whichever tank proved superior after further tests.

Unimpressed by Barnes' reasoning, officers of AGF refused to concur in any further production of the *T-23*. They wondered, quite logically, if the torquomatic transmission offered an advantage to the *T-25* and *T-26*, why it would not also offer an advantage to the *T-23*. The matter was finally settled on 11 August 1943 at a conference between the Chief of Ordnance, the Commanding General of the Armored Command, and the Chief of AGF's Requirements Section. AGF and the Armored Command finally acquiesced to the production of 50 more *T-23*'s, but the proposal to produce 1,000 untested tanks was turned down flatly.

The fate of the two tanks that Barnes wanted to produce is interesting. By 2 August 1943, Colby, then Director of R&D under Christmas, had already called Barnes and recommended abandoning the *T-20E3* because "they can't keep the transmissions running in the *T-20E3*." (The *T-25* and *T-26* used

a different torquomatic transmission.) Without detailing the long controversy over the *T-23*, it probably suffices to say, as one member of AGF's Requirements Section pointed out, "The AGF would not approve the electric drive until it passed its service tests — it never did."

Undaunted by his rebuff in August, Barnes seized the Armored Command's widely accepted proposal to upgun the *Sherman* for his next attempt to get further production of the *T-20* series. In the Ordnance Department's concurrence of 13 September 1943 to the 76-mm gun for the *M-4*, Barnes proposed to build 500 *T-23*'s, 500 *T-25*'s, and 500 *T-26*'s. Based on the conversations with AGF in August, ASF turned down the idea.

ASF's refusal to approve the Ordnance Department's proposal for a production order for *T-26*'s in the fall of 1943 plays a big part in Mayo's argument that the *T-26* could have been available for Normandy. She implies that this act stopped production of the new tank. Her argument assumes that the *T-26* was ready for production in September 1943. Nothing could be further from the truth. As a matter of fact, drafting work on the *T-25* was only 50 percent complete on 10 September, and the *T-26* was even further behind. AGF supported



The M26 Pershing tank, which arrived in Europe too late to be used during the Normandy campaign, was the center of a controversy between the Army Ground Forces and the Army Service Forces.

development and never contested the production of *T-25's* and *T-26's*, ordered in May 1943.

As an interesting parallel, AGF did concur with advance production orders for an experimental tank in September 1943. The *T-24* light tank (*M-24 Chaffee*) was desperately needed to replace the *M-3* and *M-5* light tanks, which were the subject of anguished complaints from overseas. The prospects for the *T-24* were enhanced because it used many components from the successful *T-70* tank destroyer (*M-18 Hellcat*). ASF approved the production of 1,000 *T-24's* on 21 September 1943 with AGF's concurrence. The *T-24's* did not begin dribbling into Europe until the spring of 1945. Clearly, early production orders for a tank were no guarantee of the early availability of that tank for combat.

Apparently expecting his production proposals of September to be turned down, Barnes had begun to prepare other avenues of attack even before ASF returned its refusal. During the fall of 1943, Barnes managed to sell the *T-26* to some important British generals who were in the United States. Barnes asked them to order the *T-26* "to wake our people up." Barnes' efforts to till the fields of coalition warfare bore fruit on 13 November 1943 when Lieutenant General Jacob L. Devers, Commander of the European Theater of Operations (ETO), requested the production of 250 *T-26's*. British

influence was made obvious by Devers' comment that the English were expected to order 500 of the tanks.

Devers' request aroused vehement opposition from McNair. In McNair's mind, the only justification for the *T-26* was as a tank-killer. The answer to heavy German tanks, McNair believed, was a tank destroyer with a 90-mm gun, and he had already approved the production of 500 *T-71's* (*M-36 Jackson*). McNair's position was strengthened by the responses received by the War Department as a result of its queries to the theaters asking the overseas commanders about their desires for future tanks. No one, including ETO in its letter of 21 October, had asked for the *T-26*. Most importantly, General Dwight D. Eisenhower's North African Theater of Operations, the only theater with combat experience, specifically rejected the *T-26* because it was "too heavy."

Faced with a storm of opposition to the *T-26*, the War Department asked Devers to reaffirm his request. After Devers did so, the dispute was settled by Marshall. Apparently unwilling to refuse a request from an overseas commander, Marshall ordered the production of the *T-26*, overruling McNair. However, when Marshall cabled his decision to Devers on 21 December 1943, he cautioned the latter not to expect production for 9 months. Mar-



The prototype of this T-25 tank was plagued by transmission and brake problems.

An M-24 Chaffee tank opens fire downrange. M-24's did not appear in Europe until the spring of 1945.



shall's estimate proved to be only a little optimistic.

After receiving production orders from the War Department, ASF quickly ordered the Ordnance Department to expedite development, and asked for an estimate of the earliest production. On 14 January 1944, the Ordnance Department estimated that production could begin in July, but by 19 February, the estimate was revised to October. It is significant that no one in the Ordnance Department believed, during the events, that the *T-26* could enter production before the fall of 1944. The idea that the *T-26* could have been ready for Normandy was strictly a postwar assessment.

In addition, the supposition that the *Pershing* could have been ready for combat by the spring of 1944 was not supported by the first prototypes of the *T-25* and *T-26* that were finally completed during January 1944. Contrary to usual procedure, AGF rushed members of the Armored Board to Aberdeen to expedite tests of the new tanks. While the officers from Fort Knox were impressed enough with the promise of the new tank to recommend further production, they were adamant that the tank was not satisfactory in "its present form." Among many other deficiencies, the brakes of the new tanks had to be adjusted every 50 miles, and burned out completely in a few hundred miles. In addition, the coupling between the engine and transmission failed frequently. However, the tankers were most annoyed by the unfortunate system used to stow ammunition on the new tank. Ammunition was stowed in metal satchels that contained two rounds each. As the rounds were expended, the satchels had to be removed to expose more main gun ammunition. Unhappily, the satchels could not be discarded, since they were needed for resupply. As

firing commenced, the turret was soon filled with empty satchels and expended brass.

In conclusion, Lesley J. McNair was certainly not to blame for the technological problems of the Ordnance Department, or the failure of that agency to solve those problems more quickly. The Ordnance Department required some 9 months to produce the prototype of the tanks ordered in May 1943, despite a complete lack of opposition to development. In spite of a large production order, the War Department ordered 2,000 more *T-26*'s in April 1944. Ordnance needed 10 months before the first *Pershings* began to roll off the production lines in the very last days of October. The tankers at the Bulge should not have blamed McNair for their equipment's deficiencies. McNair was instrumental in producing the best mobile weapon capable of killing a *Tiger* that was available to the troops, the *M-36* Motor Gun Carriage. If McNair could have had his way, there would have been more 90-mm guns available to the beleaguered American soldiers in the freezing Ardennes forest.



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During the past year a number of articles have appeared in various news and professional magazines discussing the events of the recent Arab-Israeli conflict. Since a great number of tank hulks littered the battlefield and the air arms of both sides took serious casualties in a short time frame, it is proposed that these weapon systems are obsolete and have lost their usefulness. Other writers quickly point out that the Middle East experience has proven that the U.S. Army is moving in the right direction in the development of its armor and combined arms doctrine. However, the question which remains to be asked and answered is: *"Should current direction be modified based on the recent experience?"*

The armored forces which opposed one another during the October War can be considered large, even by the standards of El Alamein, Kursk, and the Bulge. The tank forces employed by Rommel and the British were significantly smaller than those taking part in the Middle East conflict. What signif-

Old Lessons Learned

by Major K. P. Hein

icant points stand out in this great experiment of mobile warfare? How may current weapon systems and new techniques of employment change the way in which we conduct our operations and handle our resources on the battlefield in the future?

In order to answer these questions, we need to first take a look at the key points and significant observations which can be made from the October War. Let us quickly recount the events which are important to this discussion.

The Syrian Front

Syria assaulted Israeli forces with 1,000 tanks, attacking along three major axes. To resist this onslaught, Israel had fewer than 100 tanks available. Israeli units met the enemy by deploying into company-size units and fighting a series of tank battles at rather great odds. The Syrian wave rolled forward, forcing the defenders into isolated pockets on high ground. They continued to advance, leaving the isolated defenders behind intact. By the time they had reached the Jordan River, the attackers had lost almost half their force. When Israel launched her counterattack, the Syrians were in bad shape. They had fresh forces opposing them; the combat effectiveness of their own forces was seriously impaired; and the bypassed Israeli strong points were menacing them from the rear. It is no small wonder that the Israeli counteroffensive was so successful, ending a few miles outside of Damascus.

Here is a lesson in the effectiveness of the mobile defense. The attacker is met with a light force on dominating terrain, and a great toll is extracted from the exposed force. Should units become isolated, due to the liquidity of the situation, they form strong points until the counterattack relieves them. When the enemy's offensive power has been sufficiently reduced, and while his communications, supplies, and artillery are all disposed forward to support the attack, the counterattack is launched. Every tank

available is thrown into the counterattack. The enemy is caught off balance since his combat strength is materially reduced and his combat support is still moving forward. The counterattack is executed with such speed and determination that the enemy is not given the chance to take the defensive, thereby causing the opportunity for a stunning defeat of the enemy to slowly fade away. The motto of the attack must be: "Attack! Attack! Attack!" The objective must be to cut through the thin and surprised offense of the enemy, to reach into his rear and destroy communications, supply, artillery, and air-defense weapons. Bypassed pockets are quickly eliminated by follow-up infantry units, supported by direct and indirect-fire support weapons and close support aircraft.

These are lessons which the Israelis understood, but which the Syrians did not heed. Contrary to the analysis of the tank-doomsday-sayers, the tank controlled the battlefield.

Two key points seem to stem from this action.

- Syria did not eliminate bypassed pockets of resistance, thereby seriously reducing its maneuver room in the rear.
- To meet the counterattack, Syria had only its seriously reduced armor because its combat power had been slowly dissipated by a well executed mobile defense.

The Southern Front

In the south, the Israeli Defense Force (IDF) had a more difficult time. Its Sinai Division had been kept to the rear in order not to give the Egyptians the slightest provocation along the Suez front. Egypt, after crossing the canal, realized the great threat which the IDF armor posed to its success, and immediately deployed infantry tank-killing teams along the most likely armor avenues of approach. Additionally, the Israeli Defense Force was slow in concentrating its combat power because of the observance of the Jewish holiday. This allowed the attacker to consolidate his bridgehead and to prepare for the expected counterattack.

The responsibility for the counterattack fell mainly on the Sinai Division. The division, consisting of 150 to 200 tanks, moved forward and charged into the heavily defended east bank positions. An over-strength defense of five divisions and 500 tanks met the poorly planned attack of the Sinai Division. The result was complete failure. Israeli columns were badly mauled, particularly by the antitank teams armed mainly with ATGM's. The reason for this failure may be explained very simply. First, the armor rolled into the ambush sites without infantry protection. Second, artillery supporting fires were not employed in support of the tanks. Third, air support was sparse because of the air-defense umbrella which Egypt had devised. And finally, the counterattack was premature in that not enough enemy armor had been dissipated before a direct response was undertaken.

From this small action, we learn again that combined arms operations are essential and that tanks, without artillery and infantry support, are subject to serious losses. Operations against a well fortified bridgehead or position must be carefully coordinated and planned to succeed. Counterattacks against such positions must be carried out early while the attacker is still trying to gain a foothold, but once he is established, a direct response must be thoroughly

planned. Given properly-equipped and sufficiently strong forces, an indirect response to such a situation may be more fruitful and less expensive as was so aptly proven in the later part of the conflict.

By late Sunday afternoon, 7 October, Israel had only 90 tanks left of her original 250. The first battle was clearly won by the Egyptians and a choice was presented to them. Should they capture the east-west passes, or should they reorganize and reinforce the bridgehead? They decided on the latter option. Had Egypt exploited its success quickly and gained the passes; it could have pushed on and seriously interfered with Israeli countermoves, especially at this point in the war when complete surprise was achieved and futile Israeli counterattacks were successfully repulsed. *When surprise is gained, it must be quickly and resolutely exploited. Every piece of equipment, man, and ounce of energy must be mustered to carry along the attack.*

To the Egyptians' misfortune, they decided to consolidate their bridgehead under their immobile air-defense shield. They knew that once they ventured outside this cover, Israeli air and armored forces would be on advantageous ground and more than a match for the Egyptian Army. So, they sat in their bridgehead. One might ask why this attack was launched in the first place, when such carefully conceived and attained surprise was wasted in such a fashion. Egypt's antiaircraft umbrella was well planned to counteract the Israeli air-ground combination and proved to be extremely effective. However, why was this weapon static instead of mobile? May this umbrella be more the result of the air-defense strategy of 1967 to 1973 and, as such, an accidental byproduct, rather than a well-planned and integrated strategy of the attack? Be that as it may, a great lesson can be learned from this experience.

Israel was not able to bring her total power to bear on the bridgehead because the Egyptian um-

brella robbed them of their close air support. The Egyptian General Staff, I am sure, was hoping that the IDF would wear itself out in frontal attacks against Soviet style firepower. However, they were fooled — their adversaries chose the indirect response; launched the southern outflanking movement at night, quickly crossed to the west bank, and rapidly exploited their success by destroying supplies, communications, and air-defense installations. Once the threat of surface-to-air missiles had been eliminated, the IDF ground-air team was able to

quickly expand its operations and put the Egyptian Army into a very serious position indeed. If outside powers had not intervened to force a political settlement, the final victory of the IDF would have been more astonishing than the one in 1967. In the final analysis, it was the tank which provided this outstanding opportunity through its mobility and firepower.

The following key elements stand out in the Sinai operations:

- Armor must be employed as part of the combined arms team.
- Overcoming well-defended positions must be accomplished through very thorough planning.
- Piecemeal employment of forces is an absolute folly if the enemy is prepared.
- The sophistication of current air-defense weapon systems is sufficient to provide ground forces an effective counter to air superiority.

What Can Be Learned?

What is the mission of armor? How do we counter an enemy who seems to have a superiority in armor? How do we protect our resources from the ground and from the air?

The Mission of Armor

Current U.S. Army doctrine states that the mission of armor is to close with and destroy the enemy using fire, maneuver, and shock action. It is interesting to observe that the mission of the infantry (mounted or dismounted) is to close with the enemy by means of fire and maneuver, to destroy or capture him, or to repel his assault by fire, close combat, and counterattack. The basic difference between these two mission statements is essentially that it is felt that for some reason the infantry is uniquely qualified for counterattack missions. Other than that, the words "shock action" differentiate the two arms. However, this is not a difference of mission, but rather a difference caused by physical characteristics.

Whether these mission statements are realistic or not remains to be seen. However, the way in which the Germans, Russians, and Israelis have used their armored forces, it seems clear that closing with and destroying the enemy is the farthest thing from their minds. Closing with and destroying the enemy, too many times, leads to setpiece battles with their resulting high casualties in men and equipment.

Armor is only one kind of weapon, and that is an offensive one. *Whether the mission is offense or defense for the overall force, the mission of armor is to penetrate and break through.*

In the offensive, armor crashes through the defense, bypasses strong points, and eliminates and disrupts the enemy's combat and combat service support installations to isolate the defender from his support base and to prevent the enemy counterattack. Followup infantry-heavy forces destroy the bypassed enemy. Speed is the key to the *Einbruch und Durchbruch* (penetration and breakthrough) doctrine. The defender must always be forced to react to the attacker. If the defender is allowed freedom of choice, the attack will be doomed to failure. The Egyptian attack across the canal in October 1973 is a good illustration of this shortcoming. When Egypt decided to reinforce the bridgehead, it allowed freedom of action to Israel. On the other hand, the IDF chose not to attack the bridgehead directly, but instead went for the indirect approach of isolating the enemy in the bridgehead from the

Defensively, the tank must not be needlessly employed as a mobile pillbox or an antitank weapon unless no other weapons system can be brought into action.

south. *The option of indirect response is only open to a fast moving, highly mobile force. It requires speed, firepower, and superb control. In short, it requires the tank and proves that the tank still is the main weapon on the battlefield.*

Defensively, the tank must not be needlessly employed as a mobile pillbox or an antitank weapon unless no other weapon system can be brought into action. During the Middle East fighting, most of the antitank action was admittedly carried by the tank. However, by 14 October, Israel had received the TOW missile and hurriedly put it into use. Out of the several dozen fired, it is reported that the IDF achieved nearly 100 percent hits. We must recognize that familiarity with the weapon was low and that the sophisticated laser guidance system was not

in use. Defensive means such as TOW, minefields, artillery, and air must be used to dissipate the attacker's armor force. At the right moment, the counterattack is launched like a compressed spring, breaking into the enemy, getting into his support area and turning his attack into a major retreat. He is never given a moment for independent action. *Thus, the tank is the weapon of the offensive. It is the most critical resource on the battlefield and, as such, it must be carefully guarded and skillfully handled by its commander.* This resource must be protected from its two greatest enemies — another tank and the airplane. Last year's conflict provides ample food for thought on antitank and air-defense requirements and their integration into the combined arms concept.

Antitank

A number of weapons exist to allow the commander to protect his major offensive resources from destruction by enemy ground forces. Skillful use of these weapons must bring about effective dissipation of enemy combat power. All planning must be directed toward this goal. The defensive will never bring about the destruction of the enemy. Only offensive action can accomplish the goal of enemy surrender. *The tank is still the major ground weapon which must be defended against and which gives weight to the enemy's offense. Antitank operations and tactics are therefore of primary importance.*

Today, the responsibility for providing antitank defense is borne by the maneuver battalions. To accomplish this task, they are armed with portable ATGM's and, in addition, they are reinforced by tanks through cross attachment. But if we expect to use our armor during the offensive phase, we do not want to lay it open to destruction during the dissipation phase. If the tank, with its range, mobility, and protection is not used in the defense, then what do we use as an alternate?

The TOW system saw limited action during the recent Mideast conflict. However, it was extremely effective when used. Recently, a test was conducted in Germany in which missile firing helicopters were pitted against a well-trained German tank company. The results show a great superiority of the airborne antitank system over the tank. The new laser guidance system, which is planned, should dramatically increase the effectiveness of this system. The purpose of antitank defense must be to kill or render the tank combat-ineffective until the friendly counterattack is well on its way to success.

If an armored attack is to be slowed by a TOW missile system, a number of basic principles must be well understood and kept in mind. First of all, a mobile force can only be opposed by a smaller and lighter force, if that defensive force possesses a greater degree of speed. The attack helicopter is ideal for this mission. By employing NOE flight techniques, it is not restricted by such obstacles as terrain, vegetation, roadblocks, and minefields. To the contrary, obstacles become an ally in antitank

operations rather than a hindrance.

In addition, secondary vehicles such as quarter-tons or light tracked vehicles could be designed so that they can become an effective comrade to the helicopter in tank killing. These vehicles must have the capability of greater speed and operating range than the tank which they will have to oppose. Also, the weapon's effective range must be at least twice that of the expected foe so that additional protection can be provided to the antitank team.

The principle of range was amply demonstrated by Rommel in the desert, where his "88's" reduced the British armor to rubble before it was even within range of its own guns. This second principle must constantly be at the forefront in antitank weapon design. The range of a weapon must not be determined by the probable area of operations, but by the probable enemy to be faced. The greatest protection an antitank force can have is the range of its weapons. Speed, operating range, and weapon range are the keys to dissipation of enemy combat power. If these three ingredients are present, the task can be accomplished with a relatively small inexpensive force.

Tank killing is a complex process requiring skill, planning, and superb control. A unit which engages in antitank defense as an "in addition to" task will usually not be very successful in its accomplishment. This is the position in which our infantry and mechanized infantry battalions find themselves today

when defending. As a result, tanks are assigned to them. This makes use of the tanks in a defensive role and, as a result, diminishes the commander's counterattack power.

It is, therefore, highly desirable to have a specialized antitank battalion assigned to each division. It would have the following mission:

- Dissipate enemy armored strength during defensive operations.
- Protect the division from enemy armored counter-attack during the offense.
- Operate the division Antitank Operations Center (ATOC) and coordinate all resources available for antitank operations such as artillery, combat engineers, tanks, etc.

This unit would be a great asset to the armor team. It would consist of armor officers who are experts in tank killing. They would plan antitank operations in conjunction with other elements, such as engineers, artillery, chemical, and aviation; thereby reinforcing the combat battalions on the FEBA and organizing the antitank defense in depth in order to prevent any surprise breakthroughs. The key contribution to mission accomplishment will be in allowing the commander freedom of action in conducting the defense, thus giving the counterattack a greater chance of success.

The antitank battalion could be organized quite inexpensively. Three line companies would be equipped with either wheeled or light, low-silhouette carriers and the TOW missile system. An attack helicopter company with TOW's would be under OPCON to this unit from the aviation battalion in order to centralize supply and maintenance operations with the parent unit. This unit, with the appropriate attachments, would then be capable of blunting the enemy's offensive edge and preparing him for the kill by the counterattack.

Air Defense

The tank's enemy on the ground is another tank or antitank weapon. Combined arms operations and the antitank battalion mentioned above would counter these threats. There is, however, another enemy from which we must protect our offensive weapon, and that is the airplane. How do we protect ourselves from this enemy? As the Germans found out during World War II, the airplane can

exert a tremendous influence over armor by seriously limiting its mobility and reducing its combat power. There is only one way to deal with this intruder, and that is to keep it out of the area of operations in the first place. The Egyptians and Israelis have shown us how effective an air shield can be. Egypt, with its static air defense in the canal area, intimidated the IDF Air Force to such an extent that

A mobile air-defense shield is needed which can engage the target well outside of friendly asset dispositions.

Israeli tank and air tactics were very well checked. Israel's full effectiveness was not restored until it had destroyed these static air-defense positions. With laser guided surface-to-air missiles and early warning systems, the airplane has one major disadvantage; namely, it has no place to hide. In any major future conflict involving the superpowers, it is doubtful whether the U.S. Air Force will be able to establish air superiority in an area of operations for any length of time. Therefore, the ground commander needs the capability of establishing an air-defense shield over his resources.

Current air-defense assets and weapon systems assigned to the division have serious shortcomings. First, surface-to-air systems are heat-seeking weapons, which means that they are fired at the target after it has passed. The result is that many times the intruder has destroyed his target before he can be attacked. What good is it to bring down the enemy plane after one's own combat assets lie smoldering on the battlefield? That is the same as locking the hen house after the fox has stolen the chicken. Second, the air-defense assets assigned to the division are so sparse that only headquarters' locations and division support command are effectively shielded. The combat units are allocated *Redeye* surface-to-air missiles which are fair-weather, tail-chase weapons with a limited range. In addition, combat elements have their automatic weapons available to them. However, by the time these are brought to bear, the aircraft's penetration is usually complete and the load may have hit its mark.

A mobile air-defense shield is needed which can engage the target well outside of friendly asset dispositions. The key here is interception before and not destruction after the fact. Combat and combat support vehicles must have automatic weapons mounted on them for air defense. The U.S. Army has long since done away with machineguns on support vehicles. This is probably based on the errone-

ous assumption that the Air Force can provide the type of air superiority of World War II, Korea, and Vietnam. This may not be the case in the future. Israel's experience in this regard should be a lesson to all of us. Once a plane has penetrated the air-defense shield, effective automatic weapons fire can quite often materially affect the accuracy of delivery.

U.S. air-defense strategy is geared to the underlying assumptions of World War II. However, the capabilities of the Soviet Air Force today versus the badly mauled Air Force of Germany, at the time our ground forces went into action, are quite different. Unfortunately, the most current strategies of an army are usually one war behind. Analysis of the capabilities of future enemies and the recent experiences in the Middle East provide us with enough to think about.

In mobile warfare, as may be conducted in the desert, the steppes of Russia, or Central Europe, air defense must be capable of centralized and decentralized operations. The air-defense bubble must be placed over each division or each individual task force. This will require that additional air-defense assets be assigned to the division, which are capable of intercepting outside the unit's area of control in order to protect combat assets. Interception range must be greater than the enemy stand-off range for air-to-ground missile launching platforms. In addition, each individual vehicle must have an air-defense capability, the effectiveness having been proven so successfully by the IDF.

The Egyptians flew from 400 to 500 air-interdiction sorties against combat, combat support, and combat service support targets. Israeli units without organic air-defense weapons were capable of delivering a great volume of air-defense fire on these intruders causing aircraft destruction, significantly affecting accuracy, or causing mission cancellation. The ability of the Israelis to deliver this heavy nonair-defense fire was mainly due to their practice of mounting automatic weapons on all possible

The handling of combat assets in the offense or defense must always be done in such a manner that the enemy will be robbed of his freedom of action.

vehicles. The effectiveness of nonair-defense weapons used in the anti-air role has been proven many times. In Korea, the U.S. lost 544 of all types of aircraft to air-defense and nonair-defense ground fire. In Vietnam, where the U.S. had complete air supremacy, with North Vietnamese aircraft making only token appearances, 410 fixed wing and 2,100 rotary craft were lost to ground fire. During the Mideast conflict, unclassified sources attribute 50 to

75 aircraft as being lost due to air-defense and nonair-defense ground fire.

Proper air-defense weapon systems, supplemented by vehicular-mounted automatic weapons fire, are an essential part to establishing the anti-aircraft bubble over the ground commander's combat support assets. With today's sophistication in anti-aircraft gunnery, the possibilities are very high of seriously countering the air threat.

Summary

Penetration, breakthrough, and encirclement is the mission of armor. Destruction of the enemy through isolation and consequent demoralization is the goal. To close with and to destroy him by close combat should only be a last resort after he is fixed in place and cut off from all sources of supply. Capturing his equipment and supplies is of the greatest advantage in continuing the attack and pressing for his surrender.

During fast-moving operations, the enemy's supply dumps are already prepositioned to support his offensive, whereas our own supplies must be laboriously brought forward. Rommel's great successes attest to this doctrine.

Dissipation of enemy combat power is vital to the doctrine of *Einbruch und Durchbruch*. This requires skillful and patient control of all the commander's resources. Counterattack assets must be skillfully protected prior to and during commitment. When committed, the motto in the words of Heinz Guderian must be: "*Klotzen nicht kleckern!*" (Strike concentrated, not dispersed).

The handling of combat assets in the offense or defense must always be done in such a manner that the enemy will be robbed of his freedom of action. The great weapon in this arena is the subtlety of the indirect approach. It is cheaper and so much more effective when properly planned and carried out.

We cannot permit ourselves to build a mental Maginot line by anchoring our tactical doctrine on the experiences of the past when we should be developing innovative tactical concepts for future mobile conflicts.

How do we propose to deal with superior tank strength? How do our forces operate in an environment devoid of air superiority? How do we dissipate enemy offensive power without depleting our offensive assets? Does our air-defense philosophy need revision — if so, what are the revisions? These are but a few of the questions that must be answered completely, and soon, if we are to avoid defeat, or even annihilation, in future battles.



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ARMORED RECONNAISSANCE SCOUT VEHICLE TEST



It is 0310. The night air is cold but clear. The scout section leader continues his observation from his observation post (OP) on the international border. Suddenly, the integrated vehicular radar indicates movement to the front at 2,800 meters. The sergeant traverses his antitank missile launcher to the designated quadrant and peers through the passive thermal night sight. Although the target is not clear, he is able to verify a moving vehicle at that range. Alerting the rest of his crew, the sergeant attempts to radio a spot report to his platoon leader. Both his primary secure FM, VHF and AM frequencies are being jammed. Quickly, he writes the report and hands it to one of his scout observers who moves off on a motorcycle which had been stowed on the scout vehicle.

Using a previously laid landline, the sergeant alerts the other vehicle in the scout section to the presence of the target. The other crew then laser designates the target for supporting artillery. By this time, the moving object has moved into recognition range. Several tanks and personnel carriers are identified by coordinated effort of the section. Another vehicular-mounted sensor indicates that the scout vehicle is being illuminated by an infrared source from another quadrant. Artillery begins to fall on the OP, activating the on-board chemical alarm. The sergeant orders his crew to button up, mask, and then prepares to engage the leading tank prior to his initial delay.

Fantasy? Buck Rogers at the laterals? Not necessarily. The Armored Reconnaissance Scout Vehicle (ARSV) Task Force completed a force development test and evaluation (FDTE), using many of these concepts and items of equipment.

The ARSV Task Force was established at Fort Knox in January 1974 with the TRADOC-directed objective of evaluating selected scout vehicle candidates, weapons systems, information acquisition



The British Scimitar combat reconnaissance vehicle, mounting a 30-mm Rarden cannon, is shown traversing the Fort Knox FDTE course. The Scimitar is powered by a 4.2-litre Jaguar XK six-cylinder gasoline engine which produces 195 b.h.p.



aids, communications systems, and other mission equipment for the scout; and, as a result of this evaluation, determining the optimum combination of all of the above systems. In order to accomplish this objective, the task force established a three-phase program. Phase I, which ran from January to June 1974, consisted of writing the operational test plan, concurrent planning with the Cavalry Scout Ad Hoc Committee (CSAC), and preparation for Phase II. Phase II, June to August, consisted of the force development test and evaluation (FDTE). Phase III, which ran from September 1974 to July 1975, consisted of a cost and operational effectiveness analysis (COEA). The COEA analyzed the cost (e.g., life-cycle of the vehicle fleet, effect of commonality, etc.) and operational (e.g., mobility characteristics, firepower, etc.) effectiveness of those vehicles, weapons, sensors, surveillance aids, and communications systems which the FDTE determined were viable candidates. It is proposed that after a review of the task force's findings by the Departments of the Army and Defense, a scout vehicle, with all mission essential equipment, be selected in December 1975. At the same time, TOE, tactical, and doctrinal changes made necessary by new equipment will be recommended.

Perhaps the most essential element in the ARSV program was the FDTE. The purpose of the test and evaluation was to provide operational field data on the scout subsystems (vehicle and mission equip-



The Lockheed version of the XM-800 Armored Reconnaissance Scout Vehicle is a 9½-ton, 6-wheeled vehicle, powered by a 300 horsepower turbo-charged Detroit Diesel engine. The vehicle is capable of speeds of 65 miles per hour on land and 6 miles per hour in the water.

The M-113½, produced by FMC, is an air-droppable, amphibious derivative of the highly successful M-113A1. The Task Force tested the M-113½ in two versions, the standard Canadian Lynx and a product-improved version with turbo-charged engine and tube-over-bar suspension.



The XR-311, produced by FMC, is a 4-wheeled drive, high mobility vehicle. Powered by a 187 horsepower V8 gasoline engine, and utilizing a unique suspension system, copied in part from the Baja "Dune Buggy," the XR-311 has superior cross-country agility at high speeds.



The AIFV (Armored Infantry Fighting Vehicle), developed by FMC, is an improved version of the M-113. Spaced armor and tube-over-bar suspension are important features. The version tested was equipped with a .50 caliber machinegun rather than the 20-mm turret shown in this illustration.



The FMC proposal to meet the XM-800 Armored Reconnaissance Scout Vehicle requirement is an 8½-ton, tracked vehicle powered by a 285 horsepower Detroit Diesel engine. Both the tracked and wheeled XM-800 candidate vehicles were tested in turreted and turretless form.



ment) for subsequent analysis and for use in the COEA. Test planning and design was continuous from March to June 1974. Detailed test planning proceeded during May and early June with the Task Force, 194th Armored Brigade Test Directorate, TRADOC Systems Analysis Agency (TRASANA), Human Resources Research Office (HUMRRO), and Tank/Automotive Command (TACOM). Also, in May, test participants were trained, candidate vehicles were acquired and prepared, test courses laid out, and data collection procedures established. Exploratory tests were then conducted in early June to verify data collection procedures and the validity of the basic test design.

The FDTE consisted of two primary tests and six side tests. The tests were based on mission profiles established by the CSAC, which depicted an armored cavalry scout performing various cavalry missions in various areas of probable employment. The CSAC group developed these mission profiles while addressing such basic questions as: Is there a need for the scout? If so, does the scout need special training and a dedicated vehicle? What special equipment and organization are required for the scout, and what will the battlefield look like that this scout is likely to fight on?

The two primary tests in the FDTE were the *scout field mobility test* and the *information acquisition test*. The mobility test consisted of a 48-hour exercise conducted on an approximately 120-

kilometer course, which was similar in terrain to the trace of the CSAC European mission profile. During this test, each candidate vehicle (table 1) traversed the course in daylight and darkness, performing the scout activities identified in the mission profile. Data was obtained on vehicle ride characteristics (by subjective crew questionnaires), mobility (time to complete each course event), and mission accomplishment (go/no go). Two terrain analyses were conducted by the ARSV Task Force and the Waterways Experimentation Station. It was determined that the Fort Knox course terrain was representative of that found in West Germany, ex-

Table 1. Armored Reconnaissance Scout Vehicle (ARSV) candidates.

	Cbt. Wt.	Ht.	Lgth.	Width	Land speed	Water speed	Road range	Crew	Vert. Wall	Trench	End press
*M-114A1E1	15,678	86.0	175.75	91.75	36	3.3	300	3	20	60	5.2
FMC "A"	19,870	89.0	177.0	96.0	63	3.6	300	3	30	74	5.4
Lockheed "A"	19,600	98.0	193.0	96.0	65	4.8	350	3	30	42	14.9
FMC "C"	18,100	66.0	177.0	96.0	51	NA	300	4+	30	74	4.9
Lockheed "C"	18,200	68.0	193.0	96.0	65.5	NA	350	4+	30	42	7.9
**M-113A1	24,080	98.0	191.5	105.75	42.5	3.6	300	12	25	66	7.6
M-113A1 (AIFV)	28,000	105.0	211.0	112.0	38.0	3.4	305	11	33	66	8.9
M-113½ LYNX	19,340	85.0	181.0	95.0	44.0	3.5	250	3	24	72	6.8
M-113½ (PI)	19,481	93.25	181.0	95.0	44.0	4.0	250	3	25	72	6.7
XR-311	6,100	78.0	170.0	76.5	80.0	NA	250	3	20	24	7.1
V-150	18,000	87.0	224.0	89.0	62.0	3.0	300	10	32	48	11.5
SCIMITAR	17,200	83.25	172.75	86.0	50.0	4.0	350	3	19.5	81	5.2
M-551 (Mod)	26,000	63.0	248.0	110.0	43.5	NA	370	4+	33	84	5.5
Suzuki 185cc	250	44.3	80.1	33.8	80.0	NA	108	1	NA	NA	15.0
***MICV	42,000	109.0	245.0	124.0	46.0	4.3	300	12	24	100	7.5

NOTE Data is from manufacturer's and previous military tests. This list in no way indicates a final selection by the ARSV Task Force.

*Not tested. Used for comparison only.

**Tested as baseline.

***Not tested.

cept for soil strength, in which the Fort Knox course was found to be more tractive when muddy.

The *information acquisition test* was conducted during the 48-hour *field mobility test*. This test was designed to obtain data on the scouts' ability to acquire threat information from stationary observation positions. At selected time intervals, both day and night, the scouts were assembled on an observation position to attempt the acquisition of live threat elements at various ranges (less than 1,000 meters, 1,500 to 2,500 meters, and 3,000 meters and over). Both moving and stationary threats were presented. Scout teams attempted to identify these threats,

while mounted and dismounted, utilizing acquisition aids varying in sophistication from the unaided eye to integrated day/night sights (table 2). Data was obtained on the percent of threats acquired and the time required as a function of equipment and team size.

As mentioned above, six side tests were also conducted during the FDTE. The *Mideast side test*, conducted by the 2d Squadron, 3d Armored Cavalry Regiment at Fort Bliss, Texas, between 12 and 23 August, consisted of the *scout field mobility test* and the *information acquisition test* on Mideast-type terrain. Terrain and weather analyses and compari-

Table 2. Sensor and surveillance candidates

ITEM	FUNCTION	CHARACTERISTICS	POSSIBLE BOI*
Night vision goggles	Open-hatch night driving/surveillance	Image intensification; 50-100-m range; weight—1.9 lbs.	One per scout vehicle
Crew served weapon sight (second generation)	Crew served weapon firing/surveillance	Image intensification; 1,000-1,200-m range; weight—6.5 lbs.	One per crew-served weapon
Hand-held thermal viewer	Surveillance	Passive; weight—5.8 lbs. (viewer) and 4.9 lbs. (battery)	One per scout vehicle
Hand-held laser range finder	Target acquisition/surveillance	Active laser; monocular	Three per scout platoon
Night thermal sight	Fire control/surveillance	Passive; 2,000-m recognition range	One per automatic cannon
Ground surveillance radar	Area surveillance	Active; detect, recognize, moving vehicles—3,000-m; moving personnel—1,500-m; weight—18 lbs.	One per scout squad
Ground laser locator designator (GLLD)	Target designation	Designate targets for guided munitions	One per scout platoon
Vehicular infrared alarm (VIRA)	Near IR detection	Detects active near IR illumination alarms, locates, and categorizes IR source. Weight—55 lbs.	One per scout vehicle

*BOI — Basis of Issue.

NOTE The above is only a partial list of some of the candidate equipment evaluated during the FDTE. This list in no way indicates a final selection by the ARSV Task Force.

sons between the Middle East and Fort Bliss were also conducted. As in the Fort Knox/West Germany comparisons, the weather and terrain at Fort Bliss were found to be very similar to that of the Middle East. In this manner, the ARSV Task Force obtained data on equipment performance in two considerably different climates and topographies, representative of potential areas of operational concern to the Army.

The second side test was the *high-horsepower-ton side test*. This test evaluated the effect of increased mobility and agility in the selected candidates' ability to evade the tracking rates of certain

threat systems. It was hypothesized that a vehicle with a high-horsepower-to-ton ratio could, utilizing its superior mobility and agility (i.e., quick acceleration, turning ability, and cross-country performance), outmaneuver the ability of a weapons gunner to track it. The tracking systems included the *M-60A1*, *M-60A2*, and *TOW*, simulating similar threat systems. This side test was conducted both at Forts Knox and Bliss.

The *load-carrying-capacity side test* utilized candidate vehicles and manufacturer-provided mockups to evaluate the ability of each of the candidates to carry all required scout mission equipment, plus varied crew sizes and weapons/sensor packages. The crew *ingress/egress side test* evaluated, by time and subjective questionnaire, the ability and ease of each crew to mount and dismount, as well as load and unload their mission equipment from each of the candidate vehicles. Both normal field equipment and arctic clothing was worn by the test crews. The *river/stream ingress/egress side test* evaluated the preparation time, plus breakdown time required for amphibious operations, and the ability of all of the candidates to enter and exit stream beds. The *recoverability side test* looked at three types of vehicle recovery: self-recovery, recovery by a similar type vehicle, and recovery by the standard Army recovery vehicles.

One of the most important portions of the FDTE was the collection of subjective data. This data was gathered by questionnaire responses from vehicle commanders, drivers, and test controllers on the mobility and side tests. Additional subjective information was gathered by extensive polling, conducted in each of the armored cavalry squadrons and regiments in CONUS and Europe. A cross-section of cavalry officers and NCO's were asked to evaluate various operational issues (i.e., communications, in-

formation acquisition, survivability, combat power, training, reliability, availability, maintainability, logistics, and human factors) and their contribution to overall mission accomplishment. These individuals also were asked to express their views as to what the new scout vehicle should be capable of, using the *M-113A1* as a baseline. In this manner, the personnel who use and fight the vehicle are having a say in what it should be able to do.

The ARSV Task Force will continue its efforts until the optimum scout vehicle is determined. The task force is using all tools available: field test data, such as the FDTE and MASTER tests; studies, such as CSAC and terrain and weather analyses; computer analysis; and the military judgment of task force members, test participants, and soldiers serving in cavalry units. Through the use of these tools, the ARSV Task Force will be able to determine which mobility platform equipped with what weapons, sensors, surveillance devices, and communications gear, will best suit the needs of the United States Cavalry in the years to come. What will this vehicle look like? Only time will tell, but one thing is for sure — with it, the scout will provide the "eyes and ears" for the commander better than ever before.

The scout section sergeant had accomplished his mission. With the highly accurate sensor and surveillance gear on board his vehicle, he was able to detect and identify the threat at a considerable range. And despite radio jamming, he was able to report what he had seen. And finally, with his antitank capability, the scout was able to cause the enemy to deploy and delay the advance. With the information provided by the scout and the time delay imposed on the enemy, the higher commander was able to react at the right time and place, and in the proper strength. Thus, the cavalry had accomplished its mission.



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THE ASSAULT GUN— TANK DESTROYER

By Captain Stephen D. Turner

Today, the United States and its NATO allies face a major Soviet armored threat in Europe. At least 10,000 Soviet and Warsaw Pact tanks directly oppose the 6,500 tanks of NATO forces. Ten Soviet tank divisions and 10 motorized divisions are capable of rolling forward behind tactical nuclear bursts to reach the Atlantic in 7 days.

The Soviets, with powerful tank formations, could rapidly achieve tactical superiority over NATO forces. The Soviet armored juggernaut was conceptualized by Marshal Vassali Sokolovski, who believed that armored vehicles (especially tanks) would be the only mobile weapons systems which could function effectively on a nuclear battlefield.

It follows then, that to cripple the Soviet offensive strategy, an effective means of countering the Soviet tank fleet must be fielded. Destruction of tanks and other armored fighting vehicles would reduce the Soviets' ability to rapidly penetrate, to mass combat power, to exploit tactical nuclear bursts, to perform reconnaissance, and to maintain mobility in a nuclear, bacteriological, chemical (NBC) environment. This article, therefore, is the examination of specific alternatives in antitank weaponry.

Current Antitank Systems

There is a popular slogan which asserts that, "The best defense against a tank is another tank." In the minds of many military thinkers, especially in the United States, this motto has become the basis for the development of antitank weaponry. In line with the tank-versus-tank concept, NATO and U.S. battle tanks are all armed with armor-defeating main guns of 90-mm, 105-mm, 120-mm, or a 152-mm gun/launcher.

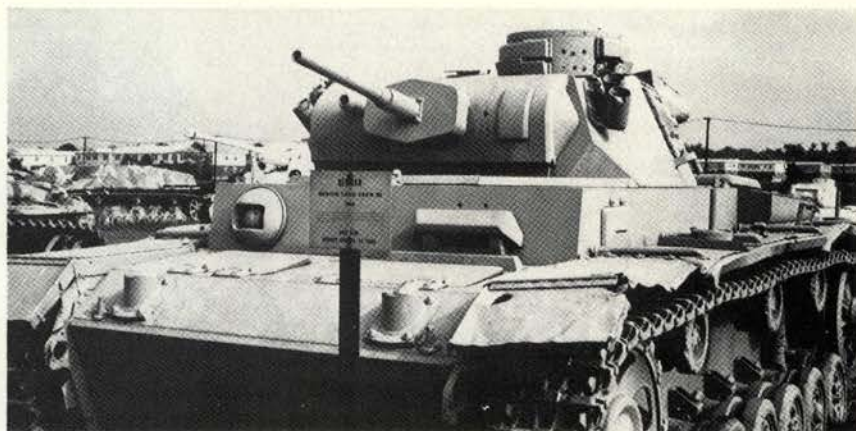
These NATO and U.S. tanks are designed to fire with extreme accuracy out to 3,000 meters and beyond. Some are designed for effective firing while on the move. Machineguns, antipersonnel rounds, and guided missile launchers give free world tanks a versatility enjoyed by no other current U.S. ground weapons system. In future hostilities, the fact that armored vehicles offer mobile shelters against radiation, chemical agents, and pathogens may make the tank completely preeminent.

Logisticians, however, would be quick to point out that tanks can create severe hardships on the support base. Tanks are expensive pieces of hardware and are getting more so each day. A staggering appetite for ammunition and POL make resupply a logistical nightmare. Their rapidly increasing complexity (i.e., laser rangefinders) is already causing consternation among the maintenance personnel who must keep the fleet operable.

Increased expense and complexity will result in smaller tank inventories for U.S. forces. Tanks could become so dear as to tempt a commander to commit them piecemeal into combat or to hoard them for decisive moments. Other combat systems could conceivably become dedicated to protecting tank forces, rather than having the tank forces operate in such a way as to exploit the tank's capabilities. Perhaps, then, we would be wise to examine other antitank systems, to find one with high lethality and lower cost.

The armed helicopter recently has achieved the capability of acting as an antitank platform. Armor-defeating rockets and guided missiles make the helicopter a deadly hunter of combat vehicles. It can pop up from defilade, fire, and then flee the battle

Figure 1. The inadequacy of the 35-mm, and later 50-mm, main gun of the Panzerkampfwagen III against the Czech M-38 tank, at the beginning of World War II, resulted in the development of the Sturmgeschütz III assault gun.



area before enemy tanks can return fire. Mobility of this weapons platform is fantastic, and accuracy of the guided missile systems is first rate. The helicopter does, however, have some serious drawbacks. It is expensive to purchase and maintain. Highly trained personnel are required to pilot, crew, and maintain it. It cannot operate effectively in extremes of climatic conditions, or in poor visibility (i.e., fog, smoke, dust). The seconds needed to guide air-launched missiles to ground targets may be costly in an air parity (or worse) environment. The growing sophistication of man-portable antiaircraft missiles, such as the *Strella*, and the abundance of Soviet antiaircraft machineguns and cannon make the helicopter less than attractive in terms of vulnerability.

In order to improve first-round hit probability and to increase destructive power against armor, NATO and Soviet countries have begun to replace (or at least augment) their recoilless rifles with antitank guided missiles. The U.S. *TOW* (in ground-launched form) and *Dragon* missile systems, the British *Swingfire*, the French/German *Milan*, and the Soviet *Snapper*, *Swatter*, and *Sagger* guided missiles all provide the gunner with the capability to

guide his missile to the target.

Man, the most vulnerable element on the battlefield, emplaces, aims, fires, and directs the man-portable guided missile systems. On a battlefield characterized by heavy artillery fire, close air support, and NBC warfare, man will be the main point of vulnerability of the man-portable guided missile systems. The encumbrances of protective mask; chemical, biological, radiological (CBR) protective garments and ground cloth; body armor, and communications equipment will make transporting the weapon difficult.

Granted, infantry will probably be provided armored personnel carriers for assault and mobile defense, but of what value are our current antitank missiles when the APC's are buttoned up? Neither our man-portable guided missiles nor our recoilless rifles have standard adapting mounts for exterior firing from the APC. The best that can be done is firing from the hatch of the *M-113A1*, and that negates armor protection.

Secondly, experience gained in the October War indicates that suppressive artillery and small arms fire directed against likely launch positions severely diminished guided missile effectiveness. Finally,

Figure 2. Turretless, squat, and powerfully armed, the Sturmgeschütz III proved to be successful throughout World War II in both its infantry support and anti-tank roles.





Figure 3. The reliable, well designed chassis of this long-barreled 75-mm version of the Panzerkampfwagen IV served as the basis for many tank destroyers, assault guns, and special purpose vehicles.

current man-portable antitank guided missiles are severely hampered by precipitation, heavy smoke, clouds of dust, and darkness (although night vision devices are being fitted to U.S. systems). Considering the vulnerability of man when separated from a mobile shelter, it is apparent that man-portable systems should not be depended upon as the backbone of U.S. antitank defense.

Let us consider towed antitank artillery. It is inexpensive, simple, adaptable for fire against various types of targets, offers rapid crew training, and has proven effective. However, to support an ever more mobile family of tanks and APC's, towed artillery must have an appropriate prime mover capable of carrying ammunition and the crew over all types of roads and across country. It must furnish small arms fire protection and CBR protection. Is such a prime mover and towed artillery combination significantly greater in overall systems reliability and versatility than self-propelled artillery?

Indeed, consider why antitank self-propelled (SP) artillery is fielded in such numbers in Soviet and European inventories. I will name a few of the current crop of SP tank destroyers. Austria fields a *Panzerjager K* which mounts a 105-mm gun in a simplified turret arrangement. West Germany has *Kanone JPZ* which has a 90-mm gun mounted to the hull (no turret) of a modified APC. The Soviets have fielded the *ASU-85*, an airborne assault vehicle, mounting an 85-mm antitank gun.

The Swedes have perhaps the finest armored tank destroyer in the world. Their *S-Tank* (the *Strv 103*) is a turretless armored vehicle rather than a tank. It has the ubiquitous 105-mm British tank gun rigidly mounted to the turretless hull. Traverse and elevation is accomplished by slewing the vehicle and by raising or lowering the rear suspension.

Obviously, a number of European countries and

the Soviets find merit in the self-propelled tank destroyer concept. On this side of the Atlantic, however, U.S. Army decisionmakers apparently have little interest in the concept. The U.S. Marine Corps has a tank destroyer called the *Ontos*, but the Army has fielded no SP antitank system since the demise of the *M-56 SPAT*. The *Ontos* suffers from a limited range and the necessity for a crewman to dismount to reload the six 106-mm recoilless rifles.

Alternatives

The weapons discussed thus far each have one or more significant deficiencies, but a selection or selections must still be made. The requirement for an antitank system which is at once reliable, sufficiently powerful, compact, all-weather, effective day and night, and which has good survivability on a variety of battlefields, grows more pressing each day. It is up to the U.S. Army's development program to field the necessary system.

At least three methods of weapons systems development and acquisition can be followed. First, procure other weapons systems similar to those in our current inventories, but which are more effective with current state-of-the-art constraints (i.e., purchase the *Kanone JPZ*). Second, develop and field an entirely new system(s) through technological breakthroughs. This path, however, is most expensive in terms of time and funding. Third, adapt, modify, or improve existing inventory items in order to meet an established requirement.

Each of these three methods has obvious advantages and disadvantages. However, in this case, I believe that there is a precedent which will make the choice among the three much clearer. Very salient lessons from a previous tank destroyer program are readily available to us, and we should consider these lessons.

From the mid-1930's until the end of World War II, German weaponsmakers were constantly called upon to react to threats to its armor superiority. That military establishment, as is ours today, was constrained in its acquisition of new, improved weapons systems by competition for funding, energy, and material shortages, limited production facilities, and by short training cycles for recruits.

German Assault Gun/Tank Destroyer Program

As early as 1936, the German infantry arm had been requesting a vehicle low in profile, very mobile, and more powerfully armed than their existing *Panzerkampfwagen* (PzKw) II and III (figure 1) series vehicles. The high command felt it imperative that a tank or self-propelled weapon capable of defeating the Czech *M-38* tank be produced. Development of the requested system had begun, but the required vehicle was still not available on the eve of the invasion. When Czechoslovakia fell, a number of *M-38*'s fell into Nazi hands. Comparison tests using these *M-38*'s revealed the inadequacy of the 37-mm and 50-mm main guns of the German tanks against firstline enemy armor.

In 1940, the *Sturmgeschuetz III* (figure 2) was fielded to meet the infantry's and the high command's requests. The *STUG III* design utilized a 75-mm assault gun attached directly on a turretless PzKw III chassis.

The 75-mm gun of the *STUG III* was provided with high explosive and armor-defeating ammunition, making it a multipurpose weapon, capable of defeating personnel, hardened positions, light vehicles, and tanks. The repair parts problem was also simplified because both the gun and the PzKw III chassis had been in the supply system long enough for parts stockage to accumulate.

This first assault gun/tank destroyer proved successful in the French campaigns of 1940 and, con-

sequently, improved *STUG III* versions in greater numbers were ordered. By early 1942, an upgunned *STUG III* mounting a longer 75-mm gun was being produced. The ultimate *STUG III* appeared by the end of 1942, with increased armor protection, armored skirts, and a machinegun for close-in defense against infantry.

The assault gun/tank destroyer configuration pioneered by the *STUG III* was a landmark of armored vehicle design. In the static defense, the vehicle would offer effective antitank capability without tying down precious friendly tank forces. If a mobile defensive situation arose, or if redeployment was necessary, the self-propelled weapon could make use of its speed and cross-country mobility.

In the offense, the assault gun followed the attacking edge of armored forces. When straggling enemy armor was crippled or flushed by the vanguard of tanks, the assault guns could make short work of them. Hard targets, such as bunkers, could be engaged by direct fire. When enemy infantry was flushed or caught in the open, the mass of the vehicle and its machinegun decimated them.

Because of its combat versatility, and because assault guns were less demanding logistically than tanks, the turretless configuration was followed throughout the war. As more powerful cannon became necessary for the destruction of improved enemy tanks, the main gun required to meet the new threat was mated to the most appropriate tank chassis. This evolutionary process, however, was not as centralized or as well organized as tank production. Consequently, several distinct "families" of self-propelled antitank vehicles and assault guns were developed and fielded.

Since the families of vehicles are so diverse and overlapping, it will be necessary to concentrate on only one family of vehicles to illustrate the assault gun/tank destroyer program. The PzKw IV (figure



Figure 4. An exceptionally low profile, coupled with an extra-long 75-mm cannon, made the Jagdpanzer IV/70 one of the best and deadliest of the tank destroyers produced by Germany during World War II.

3) tank chassis was one of the most common and versatile of the German war effort and so its family of derivatives will be used to typify the diverse evolutionary programs.

PzKw IV Variants

At the beginning of 1943, the *STUG III* designs began to be replaced by vehicles based upon the *PzKw* chassis. The *STUG IV* was the first such variant. The *STUG IV* carried the same 75-mm main gun, 43 calibers in length, as its predecessor. The chassis was from the more robust *PzKw IV*, Model *F*.

In order to make better use of the more durable and capable chassis "borrowed" from the *PzKw IV*, the *Panzerjaeger IV* (also called the *Jagdpanzer IV*) was developed. This vehicle was also turretless, but it differed in that it had a much cleaner sloped front. Frontal armor was up to 60-mm thick. This clean, ballistically sound profile set a standard for later armored vehicle designs to emulate.

In mid-1944, an upgunned version fitted with the same main gun as the *Panther* tank was introduced. This new main armament was 70 calibers long and tremendously powerful for its bore size. Frontal armor of the vehicle had been increased to 80-mm. Unfortunately, the resulting increase in weight (from 23 to 26 tons) caused an overburdening of the chassis. As a consequence, suspension reliability problems plagued the *Panzerjaeger IV/70* (*Jagdpanzer IV/70*) (figure 4).

The next variant on the *PzKw* chassis to be produced was an infantry close-support weapon which was not suitable for antitank work. A 15-cm howitzer, 12 calibers in length, was mated to a *PzKw IV* chassis in 1943. Models *F* through *J* of the *PzKw IV* were used for this mating. The vehicle was provided with up to 100-mm of armor protection on the front, which, when combined with the

weight of the howitzer, made the *Brummbaer* (figure 5) a real heavyweight, totaling 28.2 metric tons, which was too much for the chassis.

Although not a true assault gun/tank destroyer of the fully enclosed, turretless configuration, the 88-mm *Nashorn* (or *Hornisse*) (figure 6) bears mention. This thinly armored vehicle was ordered into production in early 1942 and saw service throughout the remainder of the war. Lightly armored, poor in cross-country mobility, and offering no overhead crew protection, the *Nashorn's* one saving grace was its potent 88-mm gun.

The reader is now encouraged to trace the chronological development of the *PzKw IV* derivatives through the use of Figures 1-6. Notice that the derivatives were evolutionary, not revolutionary, and that they overlapped each other.

Briefly now, let us review the significant advantages of the German assault gun/tank destroyer configuration over other contemporary designs. First, by discarding the tank turret concept, it was possible to mount a large main weapon on a low-profile compact chassis. Secondly, since engagement was expected bow-on, armor plating could be biased toward the front, and reduced in thickness elsewhere. Thirdly, the simplicity of the elevating/traversing mechanisms and the corresponding simplicity of sighting instruments simplified crew training. Fourth, turretless vehicles were more readily mass-produced than were tanks. The fifth advantage was that the use of existing components (both armament and chassis) already in the inventory allowed inexpensive production and convenient repair. In an army which came to rely heavily upon cannibalization and makeshift repair in order to keep fighting, the ready availability of spares and the standardization of components were extremely desirable. Finally, the fully enclosed assault gun design successfully met the requirements for both an infantry close-

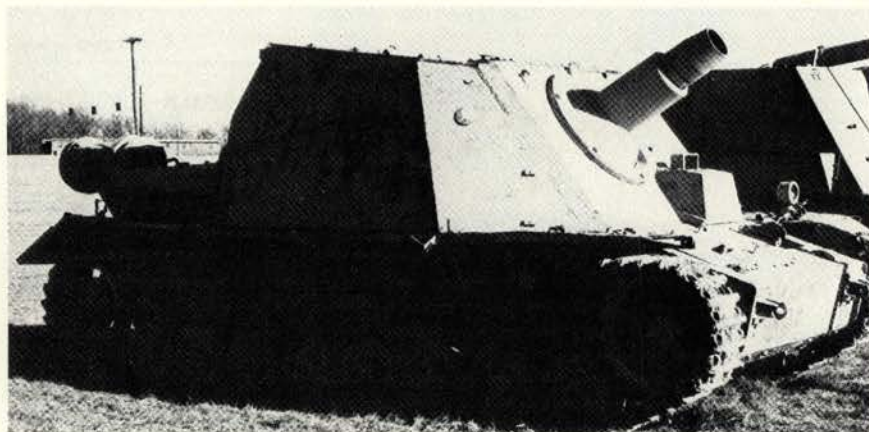


Figure 5. Equipped with a low-velocity 150-mm howitzer, and protected by 100-mm of frontal armor, the *Brummbaer* infantry close-support vehicle severely overburdened its *Panzerkampfwagen IV* chassis.

Figure 6. The Hornisse, renamed the Nashorn by Hitler, mounted a powerful 88-mm gun, but its open superstructure exposed its gun crews to the elements, artillery fragments, and strafing attacks.



support weapon and for a mobile antitank weapon.

Disadvantages of the specialized design were threefold. The most significant disadvantage was that offensive action was hindered by the limited traverse of the main gun. Unit commanders compensated for this drawback by mixing formations of turreted and turretless vehicles, and by adjusting their assault tactics. The cluttered and sharply angled superstructures of the *STUG III* and *IV* designs acted as shot traps for antitank rockets and projectiles. Another disadvantage rested with only the early *STUG III* models in that no machine-gun for close-in defense had been provided. During the bitter fighting on the Eastern Front, the lack of a close-in defense against enemy infantry was fatal to many assault gun crews. Other minor problems encountered during development and production program were caused by poor management.

Implications for Modern U.S. Army Armored Vehicle Development

The German tank destroyer and assault gun program demonstrated the desirability of the following:

- Powerful armament which is equivalent to that carried by contemporary main battle tanks.
- Compact design and low silhouette.
- Adequate armor protection completely enclosing the crew compartment.
- Reliability through proven components (even if they are captured components).
- Availability of repair parts and standardized components within the supply system.
- Outstanding cross-country mobility.
- Relatively inexpensive components and sub-assemblies which lend themselves to mass production, adaptation to captured material, and cannibalization.
- Simplicity of operation and crew training.

After examination of the armored antitank vehi-

cles in foreign inventories, and after consideration of the German Assault Gun/Tank Destroyer program, the introduction of a turretless tank destroyer into the Army's inventory seems quite feasible. Several U.S. vehicles which are fully tracked and fully enclosed are available which could be modified to the desired configuration. Armament could be the 90-mm or 105-mm tank gun, or the new 152-mm gun/launcher. A smaller caliber antitank gun may serve as well if one is designed with sufficient velocity, or if an especially effective HEAT round is developed for it.

U.S. Army prototypes mounting either a 105-mm main gun or an experimental liquid-propellant gun have already been envisioned and dubbed the CAS-A (Combined Arms System-Armor). This particular system, however, will never pass the conceptual stage without goading from field commanders. The time does seem ripe for an armored, self-propelled tank destroyer to at least be fielded in limited numbers on a trial basis. The experiences gained in testing such a vehicle might even lead to the reintroduction of a tank destroyer force. Even if initial prototypes and configurations do not prove to be the panacea we seek, they could open the door to new families of simple, maintainable, and effective ground warfare systems.



CPT STEPHEN D. TURNER was commissioned in 1969 as a Distinguished Military Graduate of McNeese State University. A graduate of the Ordnance Officer Advanced Course, Captain Turner is currently serving with the Command and Staff Training Department of the U.S. Army Ordnance School, Aberdeen Proving Grounds.

PUBLICATIONS

The Armor School has recently published a new pamphlet, *Example SOP, Armored Cavalry Troop*. Copies of this publication are being distributed to Armored Cavalry units worldwide. We will appreciate your comments and recommendations for improving it. Send to USAARMS, ATTN: ATSB-TS-CC, Fort Knox, Ky. 40121.

A new Armor School television film, ARS 34-75, *Armored Cavalry Platoon-Organization and Techniques of Movement*, is highly recommended to commanders of armored cavalry and cavalry units, down to vehicle level. It should also prove beneficial to personnel of the scout platoon. This 14-minute film, introduced by MG Donn A. Starry, depicts the platoon's organization for combat and application of the movement techniques of traveling, traveling overwatch, and bounding overwatch. It is now available through the TASO interchange program.

The new Armor Training Circulars listed below have been printed by DA and distributed to the field. If you have not received yours, check your Pinpoint Distribution requests.

- TC 17-12-3 *Battlefield Gunnery Techniques for Tanks*
- TC 17-15-2 *Maintenance Tips for the Tank Platoon Leader*
- TC 17-15-3 *Tank Platoon-Organization for Combat and Techniques of Movement*
- TC 17-36-2 *Armored Cavalry Platoon-Organization and Techniques of Movement*

Reference the excellent "Pinpoint" article by Major Bill Highlander in the May-June edition of Armor Magazine. Baltimore has recently changed their AUTOVON number for customer call-in service. The new autovon number is 584-2045. Commercial calls use 301-962-7219. This service is available from 0730 to 1600, Monday through Friday. Also, DA Form 12-4 has been replaced by 12-5.

TELEVISION TAPES

The following TV tape programs have recently been completed. They are available for either ¾- or ½-inch cassette players. And may be obtained through your local TASO, or by calling direct to the Fort Knox TV Division, AUTOVON 464-6745/3725.

NUMBER	TITLE	RUN TIME
FK-ARS-48-74	Placing Turret Into Power Operation	05:58
FK-ARS-50-74	Conduct of Fire (TCT) **	01:33
FK-ARS-51-74	Laser, Sub-Caliber Fire (TCT)	10:45
FK-ARS-53-74	Boresighting the Main Gun (TCT)	06:36
FK-ARS-54-74	Load and Clear M-85 Machine-gun (TCT)	03:49
FK-ARS-55-74	Misfire Procedures (TCT)	02:15
FK-ARS-25-75	M-85 Machingegun Bore-sighting (TCT)	05:05
FK-ARS-36-75	M-151A1 Engine Lubrication	06:15
FK-ARS-37-75	Armored Cavalry Platoon-Organization and Techniques of Movement	14:32
FK-ARS-47-75	M-151A1 Engine Cooling	05:26
FK-ARS-48-75	M-151A1 DS Charging System	12:51
FK-BH-10-75	The Army Correspondence Course Program	15:24

**TCT: Tank Commander's Test

CORRESPONDENCE COURSES

The correspondence subcourses listed below are now available. Individuals may obtain them by mailing a completed DA Form 145 to the Armor School, ATTN: ATSB-TS-CC, Ft. Knox, KY 40121.

- ARM 101 — Track Vehicle Maintenance (NEW)**
Crew maintenance services on the M-551 Armored Reconnaissance/Airborne Assault Vehicle (AR/AAV), the M-113A1 Armored Personnel Carrier (APC), and the Armored Reconnaissance Vehicle.
- ARM 103 — Vehicle Recovery (REVISED)**
Fundamentals of vehicle recovery; methods of recovery for given recovery requirements; and driving procedures to avoid terrain hazards.
- ARM 121 — Communication Procedures (REVISED)**
Application of communication security;

radio telephone procedure; and content and use of the CEOI extract.

ARM 122 — Communication Equipment and EMI (REVISED)

Characteristics, capabilities, and operation of FM radio equipment organic to the tank company and the armored cavalry troop; employment of supplemental means of communication; antennas and field expedients for antennas; and electromagnetic interference and anti-EMI measures.

ARM 130 — Basic NCO Leadership (NEW)

The concept of and responsibilities of military leadership; traits of a leader; communications in leadership; leadership aspects of human behavior; problems of command; counseling subordinates; and conduct of a noncommissioned officer.

ARM 150 — Small Arms (REVISED)

Characteristics, general data, firing and immediate action procedures for the caliber .45 automatic pistol, the M-16A1 rifle, the M-60 machinegun, the M-79 grenade launcher, and the M-72 LAW.

ARM 151 — Tank Gunnery-Materiel (REVISED)

Armament, controls, and equipment of the M-60/M-60A1 tank; direct fire control system; field disassembly and assembly procedures of the 105-mm tank gun; functioning of the 105-mm tank gun; detection and correction of malfunctions; and tank gun ammunition.

ARM 160 — Combat Intelligence (REVISED)

Collection of combat information; spot report format; procedures for reporting information; counterintelligence measures at platoon and company/troop; and procedures for handling captured enemy personnel, documents, and equipment.

ARM 167 — Troop Leading Procedure (REVISED)

Sequence of troop leading procedure; and techniques in application of troop leading procedure, emphasizing the NCO's actions.

ARM 323 — Communications-Electronics (C-E) Order (NEW)

Purpose and content of C-E orders/annexes, and location and use of information contained therein.

ARM 369 — Security Safeguards (NEW)

Responsibilities for and functions of security; counterintelligence measures to ensure unit security; processing of individual security clearances; and procedures for handling and processing classified documents.

ARM 420 — Company/Troop Communication Systems (NEW)

Communication responsibilities; the five means of communication, including their characteristics, capabilities, and limitations; radio and wire nets in the tank company and armored cavalry troop; and the procedures for using messenger, wire, visual, and sound communications.

ARM 422 — Radio Telephone Procedure (RTP) (NEW)

Purpose of RTP; use of phonetic alphabet and numerals; types of calls; use of call signs; radio net procedures; and use of selected prowords and phrases.

ARM 423 — Platoon Radio Equipment (NEW)

Characteristics, capabilities, and procedures for placing radio equipment into operation; radio set control group AN/GRA-39; tank and APC installation; Speech Security Equipment TSEC/KY-8; and preventive maintenance procedures.

ARM 467 — Troop Leading Procedure (REVISED)

Sequence of troop leading procedure; issuance of combat orders; and techniques in application of troop leading procedure, emphasizing the platoon leader's actions.

SC 535 — Large Scale Map Analysis of Terrain (REVISED)

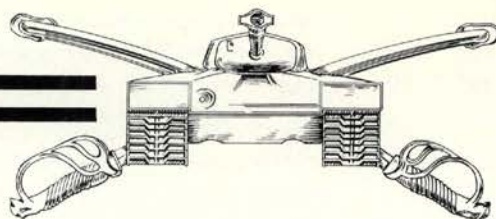
Percentage of slope from a go, no-go standpoint; line-of-sight visibility from a yes-no standpoint; analysis of streams as obstacles; effects of vegetation on visibility and obstacles; map indications of soil trafficability; road nets and their traffic carrying capacity; and effects of man-made objects on visibility and obstacles.

TEC

These additional Armor TEC lessons are in the final stages of production. It is anticipated that all will be in the hands of appropriate units by the time this article is published, or shortly thereafter.

- 020-171-1611-F Target Range Determination
- 020-171-5339-F Placing the Turret in Power Operation M-60/M-60A1 Tank
- 020-171-5361-F Initial Fire Commands, M-60/M-60A1/M-60A3 Tank
- 020-171-5366-F Before - Operation Maintenance Checks and Services, M-60/M-60A1 Tank—Part I
- 020-171-5367-F Before - Operation Maintenance Checks and Services, M-60/M-60A1 Tank—Part II
- 020-171-5370-F After - Operation Maintenance Checks and Services, M-60/M-60A1 Tank—Part II
- 020-171-5335-E The Range Finder, Part I, Familiarization, M-60/M-60A1 Tank

A new graphic training aid, GTA 17-2-3, Trouble Shooting Guide, M-60/M-60A1 Tank Crew (Turret), is now being distributed to appropriate TASO's worldwide. This pocket-size device will give a big assist to your tank crews. □



PROMOTION LISTS

The question frequently arises as to "what happens to my file if I am or am not selected for promotion?" If you are in the zone of consideration for promotion to Lieutenant Colonel or Major AUS or Major RA and your name has not appeared on the appropriate circular, you may contact your management division at OPD to verify your status.

If your name is on a current AUS promotion circular, (CPT to MAJ, MAJ to LTC) your file will be reviewed by the losing division for completeness and any pending actions, and will be forwarded to your new division within 14 working days after publication of the official list. During the period you are on the list, you may be assigned to a position requiring the grade to which you are being promoted. For example; if you are on the list for promotion to MAJ AUS, your file is maintained and managed by Majors Division and you can be re-assigned against a Major position.

If you are a reserve officer and have not been selected for the next higher AUS grade, you will continue to be managed by your current division. You will remain at your current duty station, unless programed for return from an overseas assignment, and your records will be reviewed by the next selection board. If you are twice not selected, you will be mandatorily released from active duty 90 days after notification of nonselection.

If you are a Regular Army officer, and have been selected for RA promotion, but not selected for the next AUS promotion, your records will be reviewed by each AUS selection board until you are twice not selected for RA promotion.

If you are a Regular Army officer who is not selected for RA promotion, you will remain at your current duty station, unless programed for return from an overseas assignment, and your records will be reviewed by the next RA selection board. If twice not selected, you will be mandatorily released from active duty on the first day of the seventh month following approval of the list by the Secretary of the Army.

Any officer who has completed 18 years active federal service will be allowed to complete 20 years

service and to retire in the highest grade held regardless of component or passover status.

If you have any questions concerning the above information, see AR 635-100 or AR 635-120.

FY 76 CIVILIAN SCHOOLING

The following is an update of the civilian schooling programs for FY 76. Selection for graduate study is designed to meet specific Army requirements and must be in a predetermined academic discipline; a discipline in consonance with the officer's designated alternate specialty. Prerequisites for selection are: an outstanding performance record, completion of the Advanced Course, and full qualification in his primary specialty. Undergraduate degree schooling is available to officers who have attended the Advanced Course, possess a record that supports promotion and retainability, can complete their degree within 12 months, and are available for reassignment. Civil School applications are accepted anytime and will remain active in your management file until you are selected or otherwise become ineligible. Contact Captain Sharp or Miss Wright at AUTOVON 221-7818/7819 for further details in Combat Arms Division; and Mrs. Agnes Burns at AUTOVON 221-8104 in Majors Division.

FULLY-FUNDED ADVANCED CIVIL SCHOOL

Combat Arms Division has 55 openings and Majors Division has 76 in the following disciplines for fully-funded advanced civil schooling during FY 76. Officers who are selected study for a period of up to 18 months and are required to serve a 3-year utilization tour immediately following graduation.

If interested, apply under the provisions of AR 621-1, chapter 4, dated 6 May 1974.

Journalism
Operations Research/Systems
Analysis
(Engineering & Business)
Comptrollership
Automatic Data Processing
(Engineering & Business)

Logistics Management
Electronics Engineering
Nuclear Physics
Social Psychology
Area Studies

ADVANCED DEGREE PROGRAM FOR ROTC INSTRUCTOR DUTY (ADPRID)

Combat Arms Division has a total of 125 open-

ings for officers to enter graduate school for the purpose of obtaining a masters degree and remaining at the same institution to serve a 3-year tour as an ROTC instructor. In cases where a university does not have a masters program, the graduate degree will be pursued elsewhere. Officers must study in one of the following shortage disciplines.

If interested, apply under the provisions of AR 621-101, dated 1 May 1974.

Area Studies
Engineer Electronics
ORSA Engineering
Comptrollership
Logistics Management
ADPS Business
Procurement & Contract Mgt.
Journalism
Engineering Chemical
Geodetic Science
Geography
Transportation & Traffic Mgt
Hotel & Restaurant Mgt
Engineering Radio
Engineering Petroleum
Production, Motion Picture
Physics—Optics
Safety
Physics Elec. Magnetic
Astrodynamics
Engineer Metallurgical
Jet Propulsion
Applied Mechanics

ORSA Business
Engineering ADPS
Engineering Aeronautical
Engineering Communications
Psychology, Social
Physics, Nuclear
Education Audio Visual Aids
Engineering Nuclear Effects
Guided Missiles
Criminology Corrections
Psychology, Applied
Banking & Finance
Correctional Administration
Psychology, Experimental
Topography—Photo
Food Technology
Statistics
Engineering Physics
Cultural Foundations
Textile Engineering
Math Crypto
Metallurgy
MBA (ADPS, Comptrollership
Logistics Managements, ORSA)

DEGREE COMPLETION PROGRAM

The partially-funded Degree Completion Program is the only program whereby an officer can receive full-time civilian schooling to complete an undergraduate degree. Considering the demand for the program, and limited number of schooling spaces available necessitates that OPD gives priority to those who require the least amount of time to complete the degree requirements. Twelve months is normally considered to be the maximum time authorized.

If interested, apply under the provisions of AR 621-1, chapter 8, dated 6 May 1974.

RECEIPT OF YOUR EVALUATION REPORT

One significant provision of the Officer Evaluation Report (OER) system is that each officer will receive a locally reproduced copy of his completed OER (DA Form 67-7). Our recent discussions and interviews disclose, however, that many young officers have never received their copy of a 67-7, despite the AR requirement. In some cases, of course, the OER is not completed until after your departure to a new assignment. It is the responsibility of the losing command to forward a copy of the OER to your forwarding address. Unfortunately, this system is less than perfect and the report can

get lost. If you haven't received your copy after a reasonable time (60 days), you are encouraged to query your old command to determine if a copy was, in fact, forwarded. If the report was forwarded but lost in the mail, the unit personnel officer should be able to send you another copy since he is required to keep a copy for 120 days after the cutoff date of the reporting period. To minimize the chance of not receiving your copy of the OER, make sure you provide your personnel officer with an accurate forwarding address prior to departing the command. Here in OPD, we believe that raters have an obligation to insure that each officer sees his OER ASAP, especially if it is a low report. No leader should be afraid to show reports, good or bad, to his officers.

FOREIGN SERVICE TOUR EXTENSIONS

Thinking of extending your foreign service tour (FST) or applying for an intertheater transfer (ITT)? A lot of officers are. If you are among them, don't wait until the last minute to initiate your request. Take a minute to review AR 614-30, table 7-2, change 11 and make sure that your request is submitted in time to receive favorable consideration. Requests for FST extensions and ITT's received by OPD after you have been alerted for a PCS move will not be favorably considered unless compassionate circumstances are involved that are sufficient to warrant an exception to policy.

ALTERNATE SPECIALTY DESIGNATION

Letters designating the Officer Personnel Management System (OPMS) Alternate Specialty for captains with 7 or more years commissioned service were mailed to the field on 15 July. Of the 1,141 officers awarded an alternate specialty, 1,067, or 93.5 percent, received one of their first three choices. Several factors influenced the designation process. These were the officer's preference, specialty experience and aptitude, level of civil education, and needs of the service. All officers in fiscal year group 68 or earlier, received a complete file review in order to best match the individual with a particular specialty.

If you are in fiscal year group 69, you will be among those officers who will receive an alternate specialty designation next, and a call to MAJ Dave Kuhl, the Company Grade Combat Arms Specialty Monitor, might be a good idea. Many officers have commented that they are handicapped in exercising their choice of preference because DA PAM 600-3 was unavailable for their use. Additionally, some of the specialties listed on the officer preference

form are not open to Armor officers, while others have been deleted, or combined with another. Your questions can be answered at AUTOVON 221-7819/20.

ITEMS OF SPECIAL INTEREST

Up-to-date picture. It is extremely important for an officer to have an updated photograph in his official and branch files. This is the responsibility of each individual officer. The photograph is important for many personnel actions, particularly selection board actions, and is required every 4 years, except for colonels, who need one every 3 years.

Evaluation. It is important that your file contain every evaluation report submitted, yet many files are deficient in this respect. MILPERCEN has a system for tracing a report that does not come in on time. We write a letter to the field in an attempt to locate the report, but this is a problem which requires the assistance of everyone. No one is more qualified to track a report than the rated officer, who knows who the rater and indorser were, and what may have happened to the OER. If, in reviewing your file, you discover a report missing, contact your assignment officer and start tracking it down immediately. Your chances for promotion are much better if all of your OER's are on file.

Officer Record Brief (ORB). There is a great deal of important information on your ORB. Listed below are some of the items that you should check for correctness.

Civilian Education. If you have completed a baccalaureate or masters degree, there is only one way for that information to get on the ORB. You must take your degree to your personnel shop and initiate action to get it recorded on the ORB. You should then follow up in 2 or 3 months to see that the entry was made on the ORB.

Awards and Decorations. Some ORB's show awards and decorations, but the official military personnel file (OMPF) contains no back-up orders. Here again, it is your responsibility to insure that orders for any awards and decorations that you have earned are in your file. (Note: Your Branch file no longer contains copies of award orders).

Physical Statistics. When reviewing your file, take a close look at the physical statistics. Files have been known to reflect such things at 6 feet 4 inches, 127 pounds or 5 feet 8 inches, 240 pounds. Remember, it's difficult to disbelieve statistics of this nature when a photo is missing. □

DID YOU KNOW?

CHAPLAINS

Priests have accompanied most armies. They may have actually led some prehistoric forces into battle.

There is a story that Richard Coeur de Lion was the first to use military chaplains. During the Crusades when he was having trouble making his conscripts give their all for Christianity, Richard is alleged to have assigned a priest to each body of troops to arouse their martial ardor. This early military chaplain appears to have combined the tasks of lead scout with those of Troop Information and Education Officer. Before the battle he threatened malingerers with eternal damnation. Then he led them into battle with his cross held high. The conventional cross is even said to have been modified to make it a more effective instrument of hand-to-hand combat; a spike was put on one end and a heavy knob on the other.

Chaplains disappeared from military organizations during the fifteenth century. Cromwell, however, brought them back into military service in the New Model Army. Although no longer required to lead attacks, Cromwell's chaplains were required to know how to dress wounds.

BUGLE CALLS

Originally, bugle calls were used extensively to control the tactical movements of troops on the battlefield. Our encounter with the bugles of Communist enemies in Korea reminds us that certain primitive people still use them tactically—for control and for psychological effect on their enemies.

Regulation bugle calls for the British Army were written in about 1793 by the great Austrian composer Franz Josef Haydn while he was in London for a working visit of a few years.

Most of our own calls were probably inherited from the British.

"Lights Out" or "Tattoo" was first used at West Point in 1840. The name of the bugle call "tattoo" comes from the fact that it originated as a drum-beat warning to close all taverns. This was the time prescribed for taverns to turn the "taps" on liquor kegs "to" and for all soldiers to go to their quarters. References to "Taptoe" in the British Army go back as far as 1701. In our own army, regulations of 1813 prescribe a roll call "at Taptoe time."

Tattoo is probably the most beautiful call still used in our Army. It is usually blown about a half hour before Taps and is the signal to turn off lights in the squad rooms and quiet down so that those who want to can sleep.

Tattoo was used by some regiments in the Mexican War in connection with funerals.

*From Military Customs and Traditions
by Mark M. Boatner III Copyright 1956
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THE M-48A5 TANK

The *M-48A5* is basically a dieselized and upgunned version of the *M-48*-series 90-mm gun tanks used prior to introduction of the *M-60*-series. The current conversion program is not a new venture. In the early 1960's, several *M-48*-series vehicles were modified to accept the diesel engine and *M-68* 105-mm gun. The modified tank, designated *M-48A1E3*, was subjected to engineering and service tests, but the program was not advanced to the production phase. Instead, a large number of the 90-mm *M-48A1* assets were retrofitted with the diesel engine, *M-17* coincidence rangefinder, and hydraulic turret control system. The modified tank was type classified and designated *M-48A3*. The *M-48A3* was extensively used in the Republic of Vietnam.

The current program involving the upgunning of *M-48*-series tanks was initiated as an expedient to upgrade the tank fleet in the shortest possible timeframe. From the standpoint of physical characteristics, the *M-48A5* does not differ much from the *M-60A1*.

Production of the *M-48A5* is the responsibility of Anniston Army Depot and is scheduled to get underway in October.

The initial phase of the program will consist of

converting 360 *M-48A3* tanks. In a subsequent phase, about 850 unserviceable *M-48A1* vehicles will be converted to the *M-48A5* configuration. Conversion of the 1,210 tanks will be completed by late 1978. A comparison of the two tanks is shown below:

CHARACTERISTIC	M-60A1	M-48A5
GENERAL		
Weight combat loaded (tons)	54.8	53
Height (inches)	129.5	121.6
Width (inches)	143	143
Length-gun forward (inches)	371.5	366.25
Maximum speed (m.p.h.)	30	30
Cruising range (miles)	310	300
Maximum ford depth (feet)	8	4
CHARACTERISTIC		
POWERTRAIN		
Engine (model)	AVDS-1790-2C	AVDS-1790-2D
Fuel (type)	Diesel	Diesel
Fuel capacity (gallons)	385	375
Transmission (model)	CD-850-6A	CD-850-6A
TURRET		
Main Gun (mm)	105	105
Elevation (degrees)	20	19
Depression (degrees)	10	9
Rangefinder	Coincidence	Coincidence
Computer	Mechanical	Mechanical

While not a part of the conversion program, the combat and materiel developers have agreed that improvements to the basic *M-48A5* are required. Recommended improvements include: the installation of an Israeli Defense Force-type cupola, with an *M-60* machinegun; installation of an *M-60D* coax machinegun, an increase in main gun ammunition stowage to 54 rounds, and installation of two pintle mounts at the loader's station to accept the *M-60D* machinegun. Hopefully, these improvements will be ready for application in the second phase of conversion and retrofitted to previously produced tanks. According to the planned distribution schedule, reserve components will be issued some of the *M-48A5* tanks commencing in calendar year 1976.

EXECUTIVE COUNCIL MEMBER PROMOTED TO BG

Brigadier General Louis C. Taylor, a member of the Armor Association Executive Council, was promoted to his present rank in the Tennessee Army National Guard at the conclusion of graduation ceremonies 9 June at the U.S. Army War College, Carlisle Barracks. Major General DeWitt C. Smith, Jr., Commandant of the U.S. Army War College, and Mrs. Taylor pinned on the new insignia. General Taylor was among the 228 senior officers to complete the 10-month course. He was the Director of Operations and Training for the Tennessee Army National Guard in Nashville before attending the Army War College.

MODIFIED ARMORED PERSONNEL CARRIER

A modified version of a *M-113* Armored Personnel Carrier (APC), developed by a Fort Hood unit, will be reviewed by a research and development center at Fort Benning.

The center will view a video-tape presentation of the vehicle's alterations to look for characteristics of the modified APC for possible use in other vehicles.

Racks were welded on each side of the APC to facilitate exterior storage of supplies and allow more interior space for additional ammunition. Due to the extra space, the vehicle will also be able to carry weapons it would not normally carry.

Both the APC's ammunition load for the *M-60* and .50 caliber machineguns will be increased; the 7.62-mm for the *M-60* from 1,320 rounds to 8,400 rounds, and the .50 caliber from 1,995 rounds to 3,570.

The additional space will also increase the APC's basic load of 7.62-mm ammunition for *M-16* rifles from 3,100 rounds to 5,050, and will enable the vehicle to carry 144 40-mm grenades, instead of the usual 60, and 24 fragmentation grenades instead of 20.

Added to the demonstration vehicle, which the APC would not normally carry, are four Claymore mines, 12 pounds of TNT/C4, 10 *M-21* anti-tank mines, three *Dragon* missiles, and five *LAW* packs.

The combat weight of the vehicle increases from 24,238 pounds to 26,722 pounds, due to the holding capacity of the storage racks, which is a total of 1,065 pounds.

COMPUTERIZED COMBAT

Recently, (MASSTER) Modern Army Selected Systems Tests, Evaluation and Review tested a new type of armored cavalry unit by simulating combat conditions using modern computer technology.

The Position Reporting Recording System (PRRS) and the Automatic Data Collection System (ADCS) were used to assess the effectiveness of firepower on both sides during the exercise.

The PRRS uses portable transmitters that can be carried on a man's back or by vehicle. Signals are relayed from the transmitters, via towers placed around the Fort Hood reservation, to computers which pinpoint the exact location of transmission.

Specifics of a combat situation are entered by an operator to a keyboard in the ADCS.

The sophisticated computer system takes in account any countermeasure employed by a target vehicle. Based upon established tables of probability relating to distance and shell type, the computer also determines whether or not a target was hit. The entire process takes as little as 3 seconds—about as much time used on the battlefield when a tank fires on an opponent—providing results that can be evaluated faster and more accurately than is possible by human judgment. □



Cuirassier— A New Tank Destroyer

by Walter A. Hamburger

Even if most of the experts are well-informed of one of the latest developments in tank construction — the Austrian tank destroyer *Cuirassier* — this weapon seems to be so significant that it is deserving of a wider introduction and a more detailed discussion.

In planning the Austrian tank destroyer, a limited production was anticipated. For this reason, the designers dispensed with the development of a new turret and fell back on the excellent turret of the French *AMX-13*, equipped with a 105-mm gun. However, since the suspension and the entire drive system of the French tank are known to be rather insufficient, and therefore susceptible to breakdown, a new hull and suspension, as well as a new drive system, from the successful armored personnel carrier of the former Saurer Works were constructed for this turret.

This modification is expected to stimulate the development of a whole new family of armored vehicles. A tank retriever, *Greif*, has already been constructed, and an ammunition carrier is being designed. Eventually, this could lead to the development of a new version of the APC.

And now, to the technical data of the *Cuirassier*:

Weight and Dimensions:

Combat weight: 17.5 tons

Engine: 6-cylinder diesel, 300 DIN hp

Performance:

Maximum speed: 67.5 km/h

Radius of action: 520 km

Fuel capacity: 400 liters

Climbing ability: 37°

Ditch-crossing capability: 2.4 meters

Armaments:

Tank gun: 105-mm

Machine gun, MG-42: 7.62-mm

20 hand grenades, 6 smoke grenade launchers

Directional, Targeting and Observational Equipment:

Traversing mechanism: electrohydraulic

Laser rangefinder: 400-3,500 meters

Firing searchlights: infrared and white

Gearbox and steering gear:

Steering: hydrostatic

Gear change: mechanical, 6 gears

Clutch: dry

Drive Assembly:

Caterpillar track: coupling chain with rubber cushions and iron pins.

A great deal can be inferred from the foregoing data. With a speed of approximately 42 m.p.h. (68 km/h), the *Cuirassier* tank destroyer is one of the fastest armored vehicles available. It is 12 m.p.h. faster than the U.S. *M-60A1*, and even faster than the much praised German *Leopard*. It seems to be worth mentioning that the *Cuirassier*, though equipped with a 105-mm high-velocity gun, is substantially smaller than other modern tanks. These differences are seen most strikingly in a comparison with the U.S. *M-60A1*; for the *Cuirassier* is about 5 feet shorter, 3.5 feet narrower, and 2 feet lower than the U.S. tank. This means that the new tank destroyer presents an extremely small target. Even though both the *Leopard* and the French *AMX-30* are almost as low as the *Cuirassier*, their length and breadth are substantially greater. The same applies to the present standard tank of the East European countries, the *T-55*. The Russian tanks usually have low engine power that causes performance in hilly terrain to be below that of the standard Western tanks.

To give an idea of the rigorous and difficult tasks which had to be fulfilled when the vehicle was tested, the following examples are given. It should



The *Cuirassier* in a camouflage ambush position.

Survey of Present Day Standard Tanks

	<i>Cuirassier</i>	<i>M-60A1</i>	<i>Leopard</i>	<i>AMX-30</i>	<i>T-55</i>	<i>T-62</i>
Length: cm.....	550	695	700	617	600	670
Breadth: cm.....	250	363	325	310	327	335
Height: cm.....	235	329	239	229	240	260
Weight: tons.....	19	53	44.4	39.6	39.6	40
DIN-hp.....	300	750	830	720	520	570
hp/ton.....	1.71	1.56	2	2	1.44	1.56
Radius of action: km.....	520	500	560	560	400	350
Climbing ability: °.....	37	31	31	31	30	30
Speed: km/h.....	68	48	65	65	50	50

be stressed at the outset that all tests were carried out at full combat weight.

First of all, the *Cuirassier* was driven at top speed over 430 miles (700 km) of asphalt roads, and subsequently for 4 days at a steady speed of 30 m.p.h. (40-50 km/h) without interruption.

This was followed by, among other tests, a 30-hour run without stopping across heavy agricultural land, hills, ditches, tree trunks and deep channels, and over walls up to 70 centimeters high, as well as through a field of artificially prepared grenade and bomb craters.

Finally, the Austrian tank was driven many times, and with ever-increasing speed, over a specially designed undulating concrete runway several hundred meters long.

At the conclusion of the test, the commandant of the French tank testing area at Angers announced that the *Cuirassier* was the first tank in the history of Angers to have undergone a 5-week test series under the most severe conditions, without having been deadlined for a single day.

Another impressive feature of the *Cuirassier* is its firing performance. This tank destroyer is equipped with a laser rangefinder which, combined with the low gun dispersion, renders a first-round hit probability of 95 percent at a distance of 1.7 kilometers (1.05 miles). The gun is fitted with automatic loading equipment so that the *Cuirassier* can deliver 13 shots within 2 minutes with a three-man crew. This is a rate-of-fire which cannot be attained by any other tank with a revolving turret, with the exception of the *AMX-13*, which as mentioned before, no longer fulfills current combat requirements. The storage racks and the automatic loader can carry 43

rounds. Although this is somewhat less than the capacity of other Western tanks, it is still slightly more than that of Soviet tanks.

The following conclusions can be drawn from the aforementioned data: The *Cuirassier* is one of the smallest and fastest modern tanks. It is equipped with a revolving turret and has a fast, extremely accurate 105-mm gun. In addition to its high load capacity and negligible susceptibility to breakdown, as proved during the rigorous tests in France, the *Cuirassier* represents one of the most interesting current armored vehicle constructions.

The *Cuirassier* is protected by relatively light armor plating, however, in view of today's antitank weapons, the strength of the armor plating is of less importance than it was, and armor made from thinner, high quality steel brings those advantages which are so essential today, namely the small shape moving at high speed. Besides, the *Cuirassier* is an anti-tank tank, and therefore is employed in most cases in a defensive posture in an ambush gun position.



WALTER A. HAMBURGER, a native of Austria, has a degree in Electrical Engineering. A student of military history, he is Vienna military correspondent for the **Canadian Military Journal**.

SOLDIERS IN REVOLT: The American Military Today

by David Cortright. Anchor Press/Doubleday. 317 pages. 1975. \$7.65.

"In Cortright's account we learn that the struggle was not only against the war, but also against an authoritarian military machine oiled for world imperialism but sluggish in its purpose and doubtful of its mission."

With these words by Marcus Rankin in the introduction, *Soldiers in Revolt* attempts to examine the GI antiwar movement in the armed forces and its impact on the military and on government policy. Unfortunately for the author, the book runs into trouble immediately with its subtitle. The army the author perceives may have existed to some extent in the late sixties and early seventies in the eyes of the radical left, but this army does not exist today.

David Cortright, a draftee in the late sixties, was active in the antiwar movement, but the extent of his involvement is not revealed in this book. That portion of his life has tinted his views on the true impact of the GI antiwar movement on the U. S. military. The reader may find it hard to accept such statements as:

"The Nixon administration claimed and received great credit for withdrawing the Army from Vietnam but, in fact it was the rebellion of low-ranking GI's that forced the government to abandon a hopeless and suicidal policy."

The author's perceived history of the GI antiwar movement is portrayed incident by incident in the turbulent era following the 1968 Tet offensive. All aspects of the military's troubles — fraggings, race riots, and other incidents — are covered. However, the entire coverage of these problems is biased and slanted to favor the radicals, resulting in illogical conclusions. To wit:

"Significantly the largest percentage gain in Article 15's during 1972 occurred within the Air Force, again confirming our thesis that disaffection among airmen grew as a result of the Indochina air war."

In his examination of the All-Volunteer Army, Mr. Cortright views the Volunteer Army as an attempt to stop the GI antiwar movement —

"Seeing the GI movement and low morale as primarily caused by draftees

and reluctant volunteers, the Pentagon embraced the all-volunteer force as a means of changing the social base of the military and thus eliminating unrest."

— yet one paragraph later the author states:

"Many leading figures within the defense establishment were opposed to the program initially and have remained unconvinced since."

The entire book is filled with inconsistencies of presentation, faulty logic, and rhetoric which distorts any message the author is attempting to convey.

In an effort to make his book a positive criticism of the American military, the author devotes the latter part of *Soldiers in Revolt* to suggested reforms which will make the military more democratic. Some of his suggestions for reform are borrowed from foreign armies, e.g.: the use of a soldier's representative in the Bundeswehr; the Chinese People's Liberation Army's absence of rank, insignia, and caste distinction; and the Netherlands' soldiers' right to form their own unions. He advocates the right of trial in civilian courts in all but strictly military related offenses and the removal of nonjudicial punishment from the hands of the commander.

These ideals of reform are not really examined in their true light because he does not discuss the problems which currently plague these reforms, nor does he relate them to the society in which they were established. Unfortunately, the author's efforts to be objective fall far short, and his self-serving perceptions are used to justify his recommendations rather than logic.

With this final analysis —

"Imperialism is at the heart of the national security system and is the force fundamentally responsible for the counterrevolutionary, repressive aims of U. S. policy. Only if we confront this reality and challenge it throughout society and within the ranks, can we restore democratic control of the military."

— the author puts his final rhetorical touch to a book which I find of no value to the military reader who has already read a flood of works that enumerate the fault of the military *ad infinitum*. The book's only possible value to the military reader lies in its use as an example of how one segment of our society views the post-Tet Army and the

GI antiwar movement. The unfortunate aspect of this book is that the reader who is unfamiliar with the military may not see past the lack of objectivity and rhetoric and, could hold a view that the armed forces today are in revolt.

Captain Albert F. Leister Jr.
University of Washington

THE STRAINED ALLIANCE

by Robert R. Simmons. Free Press. 287 pages. 1975. \$10.95.

Robert Simmons has written an interesting analysis of the communist alliance during the "so-called Korean War." He examined the Army G-2 reports for the war period, but only used information from those marked "Most Creditable." He also used daily broadcasts from the Chinese, Russians, and North Koreans to establish the actual political interface for the period. His conclusions, which are outlined below, are fairly well substantiated, but not conclusive.

The Korean "Civil" War was not a battle of the Cold War. Politics were always in the forefront, and actually the North Korean attack was probably pre-emptive to prevent an attack by the growing South Korean war machine. The United States needed a war, not necessarily in Korea, to legitimize its international military policy and to get approval for Cold War expenditures. Therefore, the U.S. also took positive steps which required the communist alliance to react. These assertions are not substantiated and it appears this book, like many others in the last few years, is trying to shift the blame for the cold war from communism to the United States.

The book thoroughly examines the alliance between China, North Korea, and Russia. The United States, with its refusal to talk or negotiate, pushed Red China into an alliance with Russia. Russia was then instrumental in keeping Red China out of the United Nations because without the membership, Red China would be further isolated from the West. The Soviets were unprepared for the North Korean attack on the South, and during the war, made every effort to avoid confrontation with the United States. The Russians provided only second-rate equipment, and no manpower, to the war effort. As a re-

sult, North Korea decided Russia could not be depended upon to help. Red China was also surprised at the sudden war and, as a result, did not attack Taiwan. Thus, the war saved Nationalist China. Red China did not provide troops to assist North Korea until it was sure that Russia was not sending forces. While both China and Russia felt threatened by U. S. forces approaching the Yalu, only China was obligated, since there was a Chinese-North Korean bilateral defense agreement. China also became disillusioned with Russian aid, and the resulting ill-feeling should be credited as being the first step in the later Sino-Soviet split. The book presents an interesting thesis; however, it becomes dull in some places. This is especially true in the last chapter which analyzes alliances and how each participant can perceive the agreement differently.

Lieutenant Colonel Carl M. Putnam
Chief, Atlanta Readiness Group

INDIRA: A Biography of Prime Minister Gandhi

by Krishan Bhatia. Praeger Publishers. 284 pages. \$10.00.

Twice American Ambassador to India, Chester Bowles has remarked that this book, "must be read by those who wish to understand the political, economic and social forces that are now shaping the world's largest democracy." While his assertion is a bit overstated, this book does provide the reader an understanding of a very complex and fascinating nation; but even more, as a result of Bhatia's insightful and delicately balanced narrative, we are able to comprehend the personal and political life of Indira Gandhi.

Opening with an examination of the confluences which gave shape to Indira's personality and outlook, Bhatia presents many facets of her financially affluent and politically influential Westernized family. There are a number of amusing and revealing childhood experiences related here. Frequently, our own reverence for powerful leaders tends to obscure their humanness, and despite Indira's jealously guarded privacy, Bhatia successfully penetrates several times, the veil which shrouds this private person. In this case we are surprised and given to greater empathy when we discover that as a young girl Indira played with dolls. But not in a traditional way. No, her dolls were often times soldiers and political leaders, en-

tangled in a political gathering or on their way to jail.

Reared in the company of people whose philosophies gave cause and shape to an emerging India, Indira served an apprenticeship which clearly prepared her for her current role as prime minister. Bhatia illuminates her intelligence, her astute political savvy, her love for her people and both her decisiveness and peculiar inertia.

Despite his obvious struggle to reveal more of her private life, Bhatia's portrait is skillfully wrought. Although he describes many of the political realities of India and the methods employed by her leaders, we wish to discover more of the "whys" at the center of both Indira's public and private lives.

Major Gordon T. Bratz
Armor

HITLER'S LETTERS AND NOTES

by Werner Maser. Harper & Row. 390 pages. 1974. \$12.50.

In recent months, there has been a resurgence of interest in the literary world on perhaps the most controversial man of this century — Adolf Hitler and his Third Reich. The author of *Hitler's Letters and Notes* has already written one book — *Hitler: Legend, Myth & Reality*. Werner Maser is currently the director of the Institute for Studies in Contemporary History in Husum, and a lecturer at the College of Politics at the University of Munich. His positions have enabled him to research and write one of the more scholarly and unemotional efforts made in the current mania of analyzing the man, Adolf Hitler.

This book is a collection of Hitler's

personal papers as the title indicates. Beginning with his letters as a young 23-year-old man, the collection ends with Hitler's political testament of 1945. The author uses these writings to support a thesis that Hitler's views on politics and anti-Semitism were developed as a result of his experiences in World War I and the immediate period afterwards. In his effort to support this thesis, the author is relatively successful. However, several flaws in his presentation hinder his efforts and detract from the book. The manner of presentation is usually made by showing the original document on the left page and the English translation on the right page. The quality of the reproduction (marginal at times), Hitler's rather illegible handwriting, and his style of incomplete sentences and phrases forces the reader to constantly backtrack in an effort to pick up the main thought.

The book is divided into two major sections. Part I, "Letters and Bequests," deals primarily with Hitler's personal correspondence. The most interesting series in this section deals with Hitler's correspondence with Von Papen and Hindenburg that led to the Nazis' admittance into the German government. The second section, "Hitler's Political Philosophy," contains the notes of several of Hitler's speeches and writings from 1918 through 1945. It is in this second section that the author's thesis reaches its full prominence.

This work is interesting reading, but tends to be rather dry. The book is of little interest to the average military reader unless one has a real interest in the evolution of Hitler's philosophy, or in Hitler himself.

Captain Albert F. Leister, Jr.
University of Washington

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FROM THE EDITOR

Reader comments on the results of our "Reader Survey" printed in the July-August issue were appreciated.

Among other questions, several inquiries have been made concerning who reads *ARMOR* and how wide is its circulation.

As to readers, I outlined in an editor's letter 2 years ago that a subscription to *ARMOR* may be obtained through the U.S. Armor Association. It is received by members of all the services, veterans, Congressmen, professors, members of industry, historians, and libraries. The Armor School itself provides free distribution to the headquarters of all Armor and Mechanized Infantry units, Army service schools, and numerous government agencies that have a vested interest in Armor.

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Sept/Oct
1975

Coming in **ARMOR**

"Vietnam in Perspective"

Lieutenant Colonel Andrew P. O'Meara, Jr. presents an analysis of some of the conflicts that raged within our society during the period of the Vietnam Conflict and suggests the course the Army should take as America enters its third century of existence as a democracy.

"Camouflage and Deception"

Aerosol sprays, smoke, nets, pattern painting, and disruptors used to deceive and confuse the enemy are discussed in detail by First Lieutenant Stephen W. Miller.

"No More 'New' Lamps for Old Ones"

In his Professional Thought, Management Consultant George G. Eddy comments on the pitfalls of "reorganizitis."

"A Case for 'Little Joe'"

Captain James D. Brown uses an imaginary conversation between a company commander and his first sergeant to extoll the merits of "Little Joe" — an item of equipment that could make life immensely easier for tankers.

Annual Armor Conference

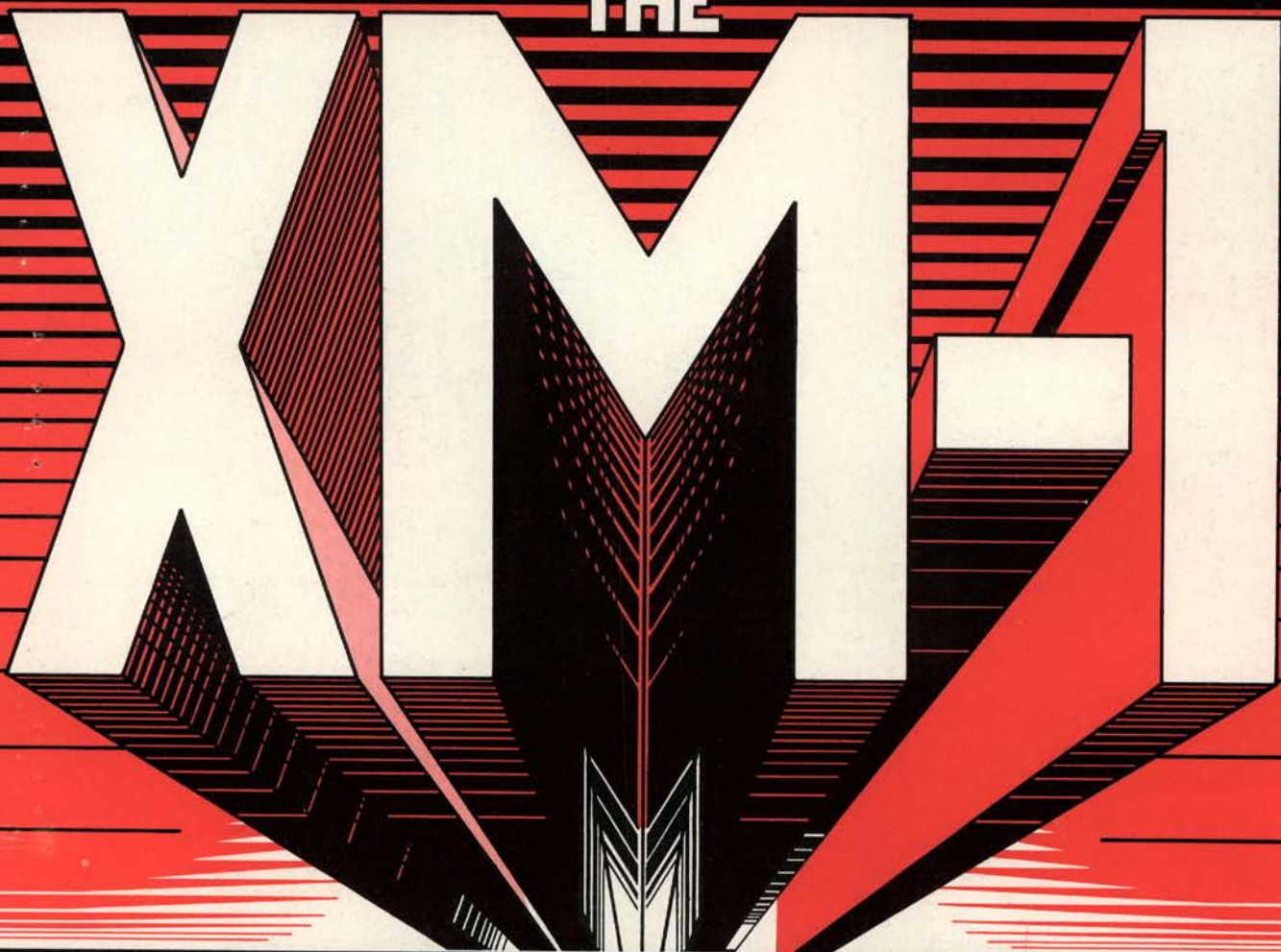
Texts of addresses and briefings presented before the Annual Armor Conference at Fort Knox, September 17-19, will be featured in the next issue of ARMOR along with photographs of other conference activities.

ARMOR

november-december 1975

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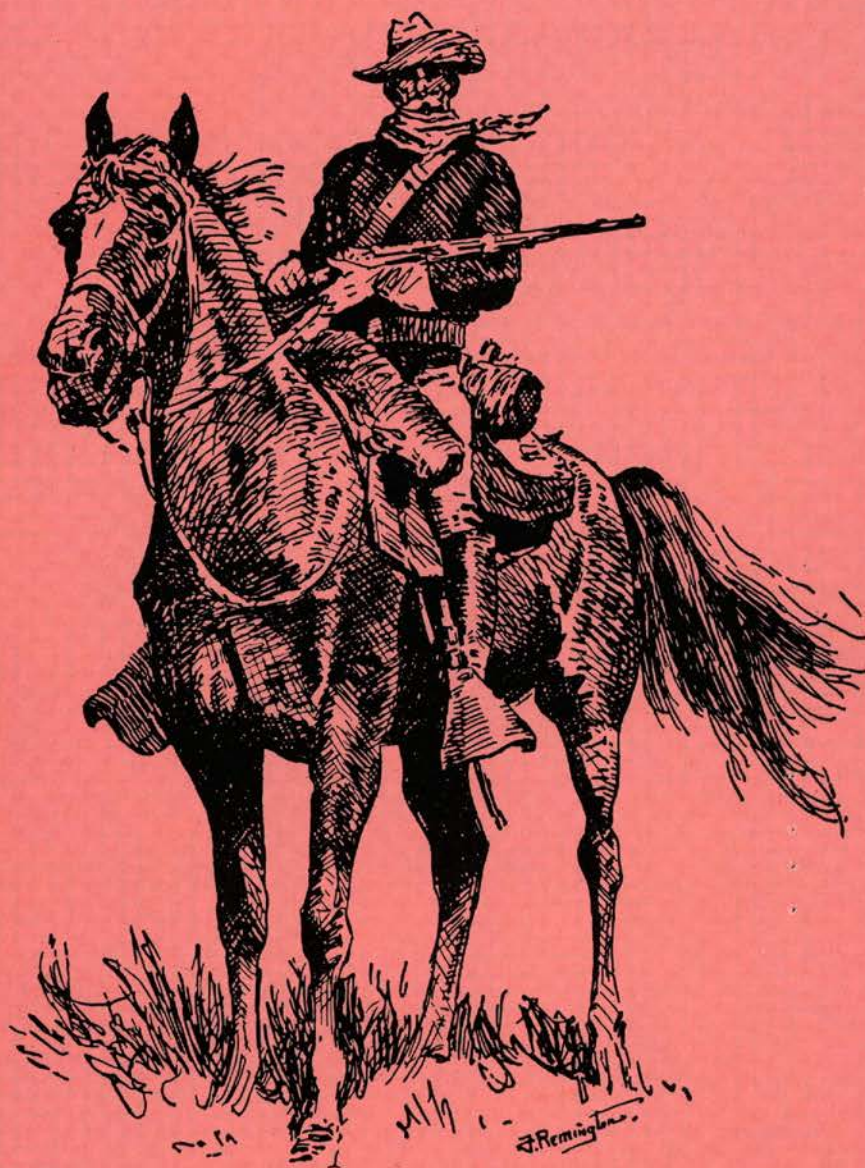
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Cover

ARMOR introduces the XM-1 Tank System with the first published photographs of the prototypes. A report by MG Robert J. Baer, Project Manager of the XM-1 tank system, which was presented before the Annual Armor Conference, begins on page 30. (Cover by Steven Flanders)

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Comments on "Commander's Hatch"

Dear Sir:

As a member of the "scattered Armor brotherhood," I have followed with considerable interest the Commander's Hatch series of articles addressing the application of lessons learned from the October 1973 war. It is encouraging to note that we (Armor) have not overreacted, but instead, have done a fair job of putting the fracas into proper perspective — that, in general, it provided confirmation that our tactical doctrine and weapon development programs are sound, but that they do need fine tuning and more money to keep pace with our opponents. I do not imply complacency in this regard by any means, but rather that our thinking appears to be on the right track even though a lack of money constrains full implementation of ideas in most areas. There are, however, several points raised in the articles that deserve some comment.

First, the September-October 1974 article implies that we were surprised by the effectiveness of some of the weapons systems employed. I certainly hope that this is not the case. Specifically, we should not have been unduly surprised by the high lethality of weaponry employed by both sides — after all, a great deal of time, money, and energy was spent to insure that these weapons would produce the results they did. Those that were marginal performers should have provided the only real surprises, and they were comparatively few.

Next, I think the three critical lessons of October 1973 (September-October 1974 issue) need to be qualified just a bit in at least one case and added to in another. In the first case, it is problematical whether long-range tank cannon and ATGM systems will "dominate" a Central European battlefield—same goes for the comment relative to forward battle area ADA weapons. "Dominate" is probably too strong a word for a host of reasons currently under study. In practice, we have quite a way to go before we can confidently say that we can hit anything we can see and kill anything we can hit — easy to say, but tough to do. In the second case, a fourth critical lesson, that was *relearned* the hard way by Israel, was the effectiveness of and the necessity for employment of a combined arms team in

ground combat. This latter point leads into my next comments regarding the Armored Cavalry article.

After initially reading the CSAC (Cavalry/Scout Ad Hoc Committee) Study last year and now the article in *ARMOR* (March-April, 1975 issue), my reaction remains the same — neither adequately answers a fundamental question:

What is wrong with the H-series TOE organization?

It is certainly able to perform in accordance with present and contemplated tactical doctrine. Sure, its equipment will change from time to time, but its organization is pretty sound. When I look at the proposed organization I start to worry a little bit. I can't get too energized over whether the mortars are at troop or platoon level, or whether scouts run around in *M-113's* and/or motorcycles in lieu of a specifically designed scout vehicle, but I do get concerned when:

- I get the impression we are not sure what we want Cavalry organizations to do.
- I don't see a rifle squad anywhere in the organization.
- I see the scouts submerged under an even deeper avalanche of equipment and weapons than they had been before.

It appears to me that in the case of the Armored Cavalry Platoon, we may be *unduly* influenced by events of the October War and the antitank, defense-oriented thinking surrounding organization for combat in Central Europe.

First, the platoon portrayed is not a combined arms team as it is purported (four times in the article) to be. It has no element that can routinely dismount and work with the tanks. As I mentioned, the Israelis learned a bitter lesson in this regard.

Secondly, it is a rather questionable discovery this late in the game that it takes a five- to six-man vehicle crew (SCORES and single vehicle exercises notwithstanding) to provide an optimum 24-hour capability. Somehow, we have been doing quite well with a three-man crew for many years. I sorta think that the extra equipment and heavy weaponry piled in and on the scout vehicle is the real driver toward the five-man crew.

Third, and perhaps most importantly, only lip service is paid to air and ground cavalry integration. Until that issue and the one regarding what Cavalry units

are supposed to do are thoroughly wrung out, tinkering with Armored Cavalry Platoon organization constitutes wheel-spinning.

All in all, it is refreshing to see articles along the lines of the Commander's Hatch series and Lieutenant Colonel Bahnsen's thoughts on gunnery. I'm all for continuous examination of what we are doing. But, let's don't change things just for the sake of change. Hopefully, if and when the proposed organization is field tested, many of the remaining issues will be resolved. In the meantime, let's keep dialogue going on the subject. I am sure that there are plenty of folks around who have other ideas.

JAMES L. DOZIER

Lieutenant Colonel (P), Armor
Vienna, Virginia 22180

Dear Sir:

In the May-June issue of *ARMOR*, General Starry presented us with a timely and most important challenge in his article "The First Battle of the Next War."

Unfortunately, as I have read our national policy as emphasized by numerous Presidents over the past twenty years, including Mr. Ford, our forces have not been permitted to initiate an attack to prevent a war, nor to win when an attack was forced upon them. Do we have reason to believe conditions will be different the next time around? I think not.

If the above concept is creditable, as I believe it is, we should, with the utmost haste, heed General Starry's warnings, and get on with our training and combat readiness at all troop levels, especially in those forces in Europe and Korea. We must be ready to:

- Absorb the first enemy attack without being destroyed.
- Hold the enemy while being reinforced.
- Recover and defeat him by offensive action.

I wish General Starry, in his comments on "What should we be training the soldiers to do?", had given more emphasis to the spirit of the offense, while defending. Troops of the 4th and 7th Armored Divisions in World War II for example, rarely considered themselves on the defense, even when greatly outnumbered by superior tank forces because of the offensive nature

of their mobile defensive tactics. In fact, they hardly realized they were the defenders as they sallied forth into the attack and counterattack day after day. This is the spirit that carries a smaller force to victory over a larger one.

Over these many years, the Armor School has emphasized this state of mind to the U.S. armor soldier and officer — not as a reckless dash to disaster, but as violent execution of an attack or counterattack, resulting from deliberate planning in the use of our combined arms teams to advantage.

Our training, strategy, tactics, intelligence, logistics, war planning, and combat operations must continue to be based upon these proven concepts.

Combined arms commanders and leaders in our CONUS and overseas areas must continue to motivate our fighting and support units to greater combat readiness by giving continued emphasis to:

- Training
- Maintenance
- Tactics and strategy
- Leadership and commandship
- Intelligence
- Teamwork
- Standards and discipline
- Combat support and logistics

Morale, the key stimuli to a victorious force, can easily be developed and maintained once our soldiers recognize and gain confidence in their training and operational excellence; and the reasons for the demands being made upon them — even when evidence of an attack is not apparent.

Returning to the basics, with emphasis on immediate operational requirements in our recruit training, Advanced, Staff Officer, and War College courses will provide our Army and our nation a force worthy of the name — The American Army — second to none.

Congratulations again to General Starry as he and the Armor School team continue in their efforts to train superior men for our armor units worldwide.

BRUCE C. CLARKE
General, USA (Retired)

Palmyra, Virginia 22963

Dear Sir:

As a reader of *ARMOR*, I wish to express my deep appreciation for MG Starry's opening message in your May-June issue. As a retired officer and a citizen of the U.S., I lament the fact that it will not be widely read. I recommend that it be published as a separate pamphlet and given the widest possible circulation; because it empha-

sizes our need for a *new military policy* which should dictate the training and organizing of our Army.

In our past wars, the U.S. Army has been a reinforcement for our allies who were already fighting. We entered on a trial-and-error basis, trusting to the trial by combat for the lessons which would enable us to forge our striking forces. As General Starry implied in his message, we must now complete the forging in *peacetime*. Are we tackling this vital job? Definitely *not*!

The first step is in selection and assignment of personnel. This is also the thorniest problem of all. Are we classifying on a basis of combat proficiency, from generals down to NCO's? The problem is thorny because, in peacetime, it is difficult to detect the good fighters. So we cling to the idea of giving them all a chance. As a result, regimental commanders in our NATO forces are limited to a year-and-a-half assignment — scarcely time to test and develop their combat proficiency. How many of them will play it safe, maintain good personal relationships with higher command, and let their staffs run the outfits? The Germans require three year assignments.

If we were really training intensively for "the first battle," teamplay and signals would be clearly known to all. This does not mean stagnation. Teamplay can be experimented with and changed. But at any one time, all commanders should know clearly what they are expected to do.

In *ARMOR*, is a good article by Captain Strickland on "Decentralized Training." Many observers have lamented our curse of *over-centralization* and *staff-command*. It seems that a Chief of Staff called for decentralization. But Captain Strickland is obviously groping in the dark as to what it means to decentralize. The high command and our schools have apparently failed on how a commander can "decentralize," and yet exert the full force of his command in all subordinate units.

In short, our troop units should be scrimmaging, instead of groping in theories about how to scrimmage. This is true not only in training, but in all aspects of command. For example, some writers in *ARMOR* seem very much in the dark about how tank maintenance will operate during combat. Somebody at the top has apparently failed to make it clear.

If the Pentagon is still dreaming of muddling through the early stages of a war, I hope that General Starry's article may awaken them to their duty to field fighting teams at the outset. We had allies who were willing to fight *behind*

our leadership. There is clear evidence that some of them, perhaps many, are wavering because of our own uncertainty.

Of course, many will say that the preparations needed to win the first battle are impossible in our political system. The political atmosphere in our country is indeed a great handicap in preparation for war. I have long believed that the senior officers in our Army should develop *political courage* to the same high standard that they expect of combat troops who must confront the dangers on the field of battle.

B. G. CHYNOWETH

Brigadier General, USA (Retired)
Berkeley, California 97407

Combined Arms Training

Dear Sir:

I would like to applaud Captain Bruce Caine's article "Dragoons and Hussars." Having spent an equal amount of time, in my still young career, in Armor and Infantry units, I see that Captain Caine is of the same school of thought as I am.

I am currently assigned to a Light (Air Assault) Infantry unit. Much to my dismay, 98 percent of my comrades have little, if any, idea about operating with Armor. By the same token, I have recently left a USAREUR based unit with little knowledge of how to really operate with mechanized infantry, much less light or airmobile infantry.

Being reasonably well versed in both areas, I must agree with Captain Caine on the need for balancing, or improving upon our much antiquated system of cross-attachment. Having experienced the gauntlet of problems arising from cross-attachment, I hope and pray that someone of power will heed the desperate need to give the real *punch* needed to maneuver units by giving them *organic* Armor, *organic* Infantry, etc. I can think of few missions, save ranger or airborne, which do not call for the *true* combined arms team. I am astonished at the low level of training in several CONUS units I have visited lately in the use of an Infantry-Armor task force. In my humble opinion, our potential enemy will be operating with masses of combined arms elements. Apparently *we* are supposed to, at the last minute, throw together a poorly trained "team," and expect results. The potential of having, within the battalion, organic Infantry to assist the tanks in crossing a woodline, or tanks to give fire support in the cities, is one which I, for one, am overjoyed to even dare to hope for.

One step more is the idea of having

all officers and NCO's trained in both areas. (I am among the lucky ones having Infantry and Armor MOS's). Consider the potential of an officer or NCO who has experience in both, his value to the Army, his expertise, his ability to deal with the multifaceted problems, common both individually and collectively to the two branches, would truly make him a valuable resource; if not an *all around soldier*.

Let's see more on the Dragoon and Hussar; hats off to Captain Caine.

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"The Big Sleep"

Dear Sir:

After having just completed a tour of duty as a service school instructor with the Ordnance and Chemical School, I read Captain Basevich's article with much interest and some sympathy. A common complaint of all students (whether enlisted or officer) is that a portion of the material presented in the program of instruction is not relevant to their perceived needs. This is generally true.

In order to make instruction more relevant, many suggestions of the Advanced Course students were incorporated into future programs of instruction at the Ordnance and Chemical School. These changes were not as well received (in some cases) as the faculty would have desired. As Captain Basevich pointed out, the backgrounds and needs of the students are as varied as the assignments they received after graduation. The composition of each Advanced Course would allow some 3-hour classes to be taught in 2 hours because of the experience level of the students. After lesson objectives have been taught in a class and there is no longer any profitable class discussion, the class should be terminated.

It is obvious that a program of instruction cannot be diversified enough to satisfy the needs of all Advanced Course students, but a course which has been properly systems engineered will satisfy most student requirements. The key to systems engineering is a steady feedback from the students themselves and from the future rater and indorser (Bn/Sqd Cmdrs, etc.) of these students. A service school has to know what job positions a graduate can expect to fill, the knowledge the graduate must have to be effective and efficient in the position, and the major problems which the current job position holder encounters.

Armed with this knowledge, the System Engineers should be able to construct a course which is both interesting and enlightening, and which is relevant to the needs of the student and the Army.

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French Armored Doctrine

Dear Sir:

Concerning the article "The Enigma of French Armored Doctrine — 1940." Captain Doughty seems to have a sound grasp of French armored doctrine in the period up to 1937 (though I strongly disagree with many of his particular observations, as well as with the way in which he downplays the role of armor in the French cavalry). I would merely observe that he does the French High Command a terrible injustice in accusing many of its members of remaining mentally stuck in the trenches of World War I — the assertion is gratuitous on his part, and utterly inapplicable to people like Maxime Weygand, Maurice Gamelin, Joseph Doumenc, *et al.* who, both in their public speaking and writing, as well as their official roles, were working hard to prepare a motorized-mechanized force for France, beginning in the early thirties, and to arm the bulk of the French nation to resist such a force. By way of results of this work, he might check General L. Loizeau's 1932 Staff College textbook, *La Manoeuvre du corps d'armee dans l'armee*, in which mobile warfare via mechanized and motorized forces takes a place of pride.

Captain Doughty, however, seems to be unaware of several crucial revisions in French armored doctrine in 1939, revisions in which the French High Command (led by that "antiquated" thinker, Gamelin) envisioned relatively independent breakthrough and strategic exploitation operations by large mechanized formations (followed up by motorized formations) with direct air support. These revisions appeared only in 1939 because heavy armor began to appear in the French Light Mechanized Divisions, and when the incipient *Divisions cuirassees* (whose creation was delayed by the inability of French industry to rapidly produce heavy and complex battle tanks) were on the point of assembling. The revisions of which I am speaking were in the February, 1939 *Reglement de la cavalerie*. *Premiere partie: Emploi de la cavalerie*, and the *Notice provisoire a l'usage des unites de la division cuirassees*

see which also appeared in February, 1939.

By 1940, the French Army had set up the mechanized and motorized formations, and the French Air Force had set up the first units of its specially adapted "Assault Aviation," which were meant to carry out this doctrine. For reasons of grand strategy (giving Britain time to rearm and respecting the ostensible neutrality of Belgium and the Netherlands), the Allied High Command renounced an initial strategic offensive. This made it impossible for the French to concentrate all their armor in one packet, since the initiative of operations lay with the Germans. The French did, however, hope to concentrate two light mechanized divisions plus their two battle-ready *Divisions cuirassees* under their First Army on the Belgian plain, where they could strike counteroffensively in conjunction with a flanking feint from the remaining light mechanized division coming through southern Holland toward the Ruhr. For reasons far too complex to enumerate here, this plan failed catastrophically. But faulty doctrine was not one of those reasons.

There is no such thing as an absolutely correct doctrine. Doctrine results from the interaction of a number of factors: the type, character and number of the friendly forces; the mission; the nature of the opposition expected; the likely terrain to be encountered; etc. This can be a very complex puzzle, with many possible solutions — there are many ways to skin a cat. The German *Blitzkrieg* doctrine of 1940 was not the "absolute" solution to the problems of mechanized war, 1940 style. It was in fact rather similar to the opposing French doctrine. But it seems to me essentially fruitless to quest ceaselessly after technical or doctrinal causes for what happened to the West — and not just to France — in 1940. Technical and doctrinal problems there may well have been, but the essential reasons for the defeat lay in the nature of the improvised Allied coalition, in the conflicting personalities of key Allied leaders, and in the battlefield errors of Allied commanders before a more experienced foe (remember Poland!). The story of what happened in 1940 offers real rewards in return for careful study — and the horror of what happened to the West in and following 1940 ought to provide all the goad a conscientious officer should need.

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THE COMMANDER'S HATCH

MG DONN A. STARRY
Commandant
US Army Armor School

TANK DESIGN: OURS AND THEIRS

Part II, 1940-45

Operationally, World War II strongly affirmed the combined arms concept. German panzer division victories in Poland, the Balkans, France, and North Africa in the early years provided dramatic demonstration of the battlefield prowess of the combined arms team in the panzer division model. Germany's foes found themselves embarrassed to a greater or lesser degree depending on how well they had rightly read Guderian and others as the panzer blitzkrieg was aborning in Wehrmacht training grounds in the late 1930's. For some, it was too late to change. By the time the French realized the bankruptcy of their operational concept, French arms had been defeated, their numerically superior tank fleet decimated by the speed, violence, and devastation of the panzer divisions.

The British quickly found their *I* tanks, built for close support of infantry, to be too slow, cumbersome, undergunned, and mechanically unreliable. They were forced to turn to their faster, better gunned, although numerically inferior, reconnaissance and breakthrough tanks; however, it was not until U.S.-made *M-3's* appeared in numbers that the British had a satisfactory tank in sufficient numbers in the Western Desert. Their mistaken operational notions nearly cost them as dearly as did those of the French.

The Soviets apparently underwent two rather dramatic changes of operational concept in the late 1930's. Earlier, we alluded to the fact that early Soviet tank doctrine was drawn from the Germans. It now appears that Soviet experience in the Spanish Civil War convinced Stalin that his tanks should be parceled out for infantry support in guerrilla-type infantry war. Accordingly, the tank generals were cut down in the Great Purge. However, the lesson of the dramatic success of the panzer blitzkrieg into France was not lost on Stalin, who promptly recreated his independent tank brigades and returned to combined arms groupments organized around tanks. In this mold the Soviets were to remain until the great nuclear debates of the Khrushchev

years were to cause them once again to tinker with their operational concepts. In the United States, once the lessons of France's fall had become obvious, there was considerable stirring to make up for lost time. The Armored Force was organized at Fort Knox in 1940, given to General Adna Chaffee to command, with instructions to organize and train two armored divisions. From the beginning these were combined arms formations. They were the embodiment of all the work, experimentation, and thought given the matter by Generals Chaffee and Van Voorhis and a handful of like-minded officers in the long dry years of American armor. However, there were precious few tanks to go around, and cavalry combat cars — light tanks — provided the tank fleet for early tank units.

As the war progressed, tank developments followed the action-reaction process alluded to earlier. In operational concepts as well as in guns, armor, and automotive power, all armies scrambled to correct their own deficiencies perceived from outcomes of campaigns in progress around the world.

Germany. The Germans, outgunned and out-armored by the Soviets in Barbarossa, moved rapidly to bigger guns and more armor in their war-year's tank design.

By 1945 the latest model Tiger tank was the most advanced machine of its kind in the world. Twenty-five years later tank designers were still trying to equal its most advanced features.

PK-IIIJ



Crew: 5
 Armament: L/60 50-mm long
 gun, 2 MG

Engine: Gasoline, 300 h.p.
 H.p./ton: 13.4 Speed: 25 m.p.h.

PK-IVG



Crew: 5
Armament: L/48 75-mm long gun, 2 MG
Engine: Gasoline, 250 h.p.
H.p./ton: 14.4 Speed: 18.5 m.p.h.

T-34



Crew: 5
Armament: 76-mm gun, later 85-mm gun, 1 MG
Engine: Diesel, 550 h.p.
Suspension: Christie
H.p./ton: 15.9 Speed: 31 m.p.h.

PANTHER D



Crew: 4
Armament: 75-mm high velocity gun, 2 MG
Engine: Gasoline, 650 h.p.
Suspension: Torsion bar
H.p./ton: 15.0 Speed: 28.6 m.p.h.

JS-II



Crew: 4
Armament: 122-mm gun, 4 MG
Engine: Diesel, 513 h.p.
H.p./ton: 11.7 Speed: 23 m.p.h.

TIGER I



Crew: 5
Armament: 88-mm gun, 2 7.92-mm MG
Engine: Gasoline, 700 h.p.
H.p./ton: 12.7 Speed: 24 m.p.h.

T-44



Crew: 4
Armament: 85-mm gun, later 100-mm gun, 2 MG
Engine: Diesel, 512 h.p.
Suspension: Torsion bar
H.p./ton: 15.1 Speed: 32 m.p.h.

Soviet Union. The Soviets reacted to German gun and armor improvements by improving the T-34, and pushing heavy tank development. Thus by war's end, the vast Soviet medium tank fleet was complemented by a light tank for reconnaissance, and a heavy tank for defeating German penetrations and supporting counterattacks.

KV-IA



Crew: 5
Armament: L/40 76.2-mm gun, 3 MG
Engine: Diesel, 550 h.p.
Suspension: Torsion Bar
H.p./ton: 11.9 Speed: 22 m.p.h.

JS-III



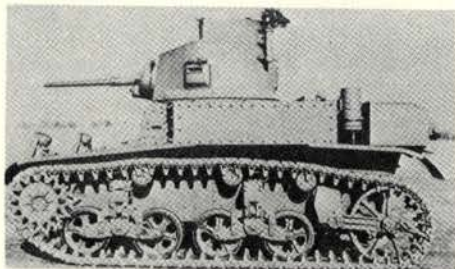
Crew: 4
Armament: 122-mm gun, 2 MG
Engine: Diesel, 519 h.p.
H.p./ton: 11.3 Speed: 23 m.p.h.

United States. In response to the early lessons of France and North Africa, the United States rushed into production a design that became the standard M-4 series, the allied workhorse of the war. Several different guns and eleven different power plants on models of this series reflected the almost complete neglect of U.S. tank component design and development from 1918-1940. Cavalry combat cars became light tanks, and for reasons identical to the Soviets, heavy tank development was begun. Characteristics of U.S. tanks in 1945 were quite similar to those of

Soviet tanks noted above.

U.S. light tanks were highly agile, mobile, under-armored and undergunned. The medium tank *M-4*

M-3 LIGHT



Crew: 4
Armament: 37-mm gun, 5 MG

Engine: Gasoline, 250 h.p.
H.p./ton: 20.3 Speed: 35 m.p.h.

M-3 MEDIUM



Crew: 6
Armament: 37-mm gun,
75-mm gun, 3-4 MG

Suspension: Vertical volute
H.p./ton: 11.3 Speed: 26 m.p.h.

M-4 MEDIUM



Crew: 5
Armament: 75-mm gun, 3 MG

Suspension: Volute Spring
H.p./ton: 12.0 Speed: 24 m.p.h.

M-24 LIGHT



Crew: 5
Armament: 75-mm gun, 3 MG
Engine: Twin Cadillac,

110 h.p. each
Suspension: Torsion bar
H.p./ton: 10.9 Speed: 35 m.p.h.

M-26 HEAVY



Crew: 5
Armament: 90-mm gun, 3 MG

Engine: Gasoline, 470 h.p.
H.p./ton: 10.2 Speed: 20 m.p.h.

was also undergunned and underarmored, but fairly agile. The U.S. *M-26* heavy tanks which appeared late in the war had fairly good armor but was underpowered, and its gun, an adaptation of the standard 90-mm antiaircraft gun of the period, was no match for the Soviet 85-mm, German 88-mm, British 20-pounder, and was completely outclassed by the Soviet 122-mm. In the September-October 1975 issue of *ARMOR*, Captain Charles H. Bailey charts the *M-26's* rocky road to battle in straightforward fashion.

While it is the main purpose of this commentary to tell the story of tank design, it is also important to note the development in almost all armies of fleets of assault guns. Essentially antitank weapons, these turretless tanks normally mounted tank cannon on a tank chassis. None had turrets. Almost from the beginning German and Soviet versions featured some overhead cover. United States designs had no overhead cover, but generally had better guns and power plants than did other tanks. In fact, the 76-mm gun on late *M-4's* and the 90-mm on the *M-26's* were adaptations of gun mounts first fielded on tank destroyers, and the *M-24* light tank power plant was an adaptation of the *M-18* tank destroyer power train. See Captain Stephen D. Turner's excellent article on this subject in the last issue of *ARMOR*. Operationally, the Soviets retained the assault gun idea, but the concept was abandoned by the United States, whose leading World War II armor commander was frequently quoted in support of the idea that the best antitank weapon is another tank.

D. Mastany

EDITOR'S NOTE: *The design and production of tanks following World War II will be discussed in the next issue.*



VIETNAM IN PERSPECTIVE

by Lieutenant Colonel Andrew P. O'Meara, Jr.

During the Vietnam Conflict, a bitter rivalry emerged between the U.S. military and a major segment of the U.S. press. As a result of that rivalry, our professional soldiers have become "Cold Warriors," or worse yet, "militarists," in the eyes of some of our country's renowned journalists. Within the military community, a hostility has emerged that has created an image of the relationship between military and media that can best be described as the relationship between a wounded antelope and a pack of wolves. Within many civilian circles in our country, including influential circles of the academic community, the antimilitary protagonist has come to see the professional soldier as an unthinking product of a "military-industrial complex." The polarization

and the tone of the invectives were virtually unknown in our country as recently as a decade ago. Polemics have become the rule, and the "research" used to support opposing arguments in this contest has occasionally been less than balanced and objective. How did we manage to get ourselves into this position? What caused a major segment of the U.S. press to desert its army in Vietnam? Why were there no Ernie Pyles produced during the Vietnam Conflict? There are no easy answers.

In the September 1974 issue of *ARMY* magazine, there appeared an analysis of the conflict between the military and the media. Entitled "The Military and the Media: A Proposal for a Cease-Fire," the analysis presented a view of military and media at



odds, with each party partially correct and partially at fault for a long and difficult period of conflict. The author of the analysis, Major General Franklin M. Davis, Jr. (U.S. Army — Retired), presented an interesting case concluding that an armistice is in order, and that a blue ribbon military-media committee is needed to propose methods whereby military and media can work out their differences, evidently as mature equals settling a mutually embarrassing quarrel.

It is a well written and thought provoking article that was based upon several assumptions. Among those assumptions were the following:

- The media and the military are capable of conducting negotiations as equals;
- Sufficient agreement exists in interpretation of recent history in order to allow mediators to establish a basis for discussion;
- The philosophy of our constitutional democracy would allow the military to enter into discussions with the representatives of the free press in order to define error, truth, and presumably a *modus operandi* that would preclude future conflict from emerging to further embarrass the media and the military.

To this professional soldier, who has long held the view that our Army and the Army of the Republic of Vietnam (ARVN) never received a fair hearing by our press during the Vietnam Conflict, it was particularly pleasing to find General Davis' article examining the ramifications of the military-media conflict. However, in the light of Watergate, it ap-

pears that a hard look at long-held views is in order. Very strong evidence has emerged within the last year that suggests that the convictions of many professional soldiers concerning the media were formed based upon an incomplete understanding of the nature of the conflicts that have raged within our society during the period of the Vietnam Conflict. The following interpretation of events is presented in an effort to widen the debate, and hopefully contribute to a better understanding of this difficult period of our nation's history.

A Conflict of Many Conflicts

The period of the Vietnam Conflict saw the United States engulfed in many conflicts. Most Americans were participants in the conflicts, yet it appears that few were sensitive to the number of conflicts that simultaneously raged within the society. Nor were many of our people aware of the impact of the outcome of one conflict upon another. Among the major conflicts to splinter our national unity in the last decade were these:

- A major constitutional crisis;
- A conflict regarding the natural limits of U.S. strategy, the vital interests of the nation, and the capabilities of the nation to protect its interests;
- A social conflict reflecting the unresolved problems of racial discrimination and related social problems of the nation; and
- an anti-Communist crusade.

In each conflict, there were at least two sides, and often more. Each of the many sides tended to be intensely committed, and they each interpreted events in terms of their own views and experience, rejecting the views and values of other polarized groups. As a result of the tactics and intensity of the commitments of the competing groups, the national body politic became badly fragmented as the conflicts continued. Of these many conflicts, few generalizations appear appropriate, except the obvious and uncontested — the body politic was never united and a foreign war was waged without a national consensus or a formal declaration of war to support it.

Many, if not most of us, who fought in Vietnam were willing participants in one conflict and unwilling participants on the periphery of another. These conflicts were the anti-Communist crusade and the constitutional crises respectively. This article will address these two conflicts, and their significance as far as military-media cooperation are concerned.

The Anti-Communist Crusade

The first of the great conflicts of the 1960's to affect our professional soldiers was the anti-Communist crusade in Southeast Asia. The Army joined this effort initially as advisors. The U.S. press accompanied the Army into Vietnam, and it appeared that the early attitude of the U.S. press was one of "wait and see." The U.S. reporter was looking for a story and an understanding of the turmoil in Vietnam. His job was complicated by the vast number of groups competing for his attention, each with a vested interest. These groups included the French *colons*, Communist fronts, and a host of lesser groups competing for influence on the complex Vietnamese political scene.

The work of the U.S. military was cut out for them, and it involved little "wait and see." An insurrection was underway that was being opposed by an inexperienced and small army, the Army of the Republic of Vietnam (ARVN). The job of the U.S. Army advisor was to train, equip, and advise ARVN. The U.S. advisors arrived with a "can do" attitude that breathed new vitality into their ally. The U.S. advisors learned about Communist insurgency in the insurrection. Endless detailed training was required to assist the Vietnamese in the mastery of modern equipment, technology, and tactics. The advisors sweated, bled, died, and their comrade-in-arms began to emerge into the 20th century.

I was one of those early advisors who was selected to advise a newly formed Vietnamese unit. The Vietnamese soldiers with whom I worked were quite openly committed to the war effort. Inspired by the South Vietnamese spirit, many U.S. soldiers formed a deep loyalty to the Vietnamese soldiers. Despite the advisors' faith in ARVN, however, the picture was by no means an optimistic one. The size of the task was immense, and the odds were often not on the advisors' side. There existed privately a wide range of opinion among some advisors, which reflected a variation in the quality of the newly formed ARVN units. Some of the negative opinion held by our advisors spilled over into the press and added an element of controversy to the reporting.

A number of members of the press corps sensed a story in the split opinion which appeared in the advisors' ranks. For many of the reporters, the faith of the advisors was seen as an official line, which was forced upon the individual advisor. To reporters such as David Halberstam, the faith of the advisors was more than an official line, it was

"all lies." These reporters failed to recognize that no one told the advisor what to report or ordered him to believe in the cause. The faith was a natural response of the individual advisor when asked to perform an extremely difficult task, and it reflected basic American attitudes: "Can do." Without that faith, the task would have been impossible. With that faith and the deep desire of the Vietnamese for an alternative to Viet Cong terror, an army was formed that, for over a decade, waged the difficult task of securing the South Vietnamese from an outside communist takeover.

It is worth noting that one great difference between advisor and reporter was that the reporter was normally an outsider, whereas the soldier was often a member of the "family." In my case, I was the only American serving with a Vietnamese troop of approximately 200 men, during my first tour in Vietnam in 1962-1963. As a result of his close association with his Vietnamese comrades-in-arms,



the American soldier often formed deep ties with the Vietnamese that were strengthened through shared hardship and sacrifice, and that ultimately were to shape his perceptions of the country. These close ties were seldom open to the reporter, due to the nature of his work.

Following the accusations in the press of distorted official reporting by the ARVN, each advisor was required to visually verify each man killed by the Vietnamese unit he accompanied. I explained these orders to my Vietnamese counterpart in the spring

of 1963. The Vietnamese commander accepted the new situation, which required the advisor to spend many hours moving between units to verify the existence of dead men. It was a situation that was often not the best utilization of the advisors' talents, and it resulted in a waste of time for the Vietnamese unit.

During this period, a vast array of "experts" emerged to explain the war to the U.S. citizen. In a very real sense, the U.S. body politic was called upon to make a decision. The U.S. citizen held a veto that could cut off assistance to South Vietnam. A vast array of opinions competed to be heard. The Communist press in Asia and Europe invested vast amounts of money in selling the idea that the Communists were not a part of the revolution and that the U.S. support of South Vietnam was imperialism. Neo-Marxists waxed eloquent both in European universities and on campuses in America denouncing "American imperialism and aggression upon peace loving farmers."

As the war was prolonged, the favorable coverage of the U.S. efforts in Vietnam became rare and finally virtually nonexistent. As a soldier who spent two tours of duty in Vietnam as both an advisor and later as a member of a U.S. troop unit, I meticulously studied the U.S. television, newspapers, and periodicals in search of the Vietnam I had known, in search of a ray of hope that the sacrifice had not been in vain. Eventually, completely turned off by what I saw as a lack of fair and balanced treatment of the war by the U.S. media, I again volunteered for duty abroad.

The Constitutional Crisis

While the advisors and the U.S. troop units fought their intense struggle far from home, another equally dangerous battle was being waged in America. It was largely a war fought by intellectuals and politicians. The great question was whether or not we were going to preserve our constitution. The great struggle that had ensued in Southeast Asia precipitated the constitutional crisis. The war pitted the U.S. Army, Navy, Air Force, and U.S. allies in South Vietnam against Communist forces composed of North Vietnamese, the Viet Cong, and liberation movements in Cambodia and Laos. The Communist forces were supported by massive military aid from both the U.S.S.R. and the People's Republic of China. The U.S. foreign policy appeared firmly committed to support of South Vietnam, a position that had enjoyed wide public support during the

Eisenhower Administration. Yet the support was never tested. The body politic was never told, "These are the stakes! Make your choice." Instead a legislative loophole was mushroomed into a four lane tunnel to pour support into our ally. In so doing, President Johnson stepped outside the Constitution to carry out a policy that he was convinced was right. Since he had no mandate to send the nation to war, the President gravely miscalculated and attempted to have the best of both alternatives, peace and war. He sought to quickly crush the U.S. opponents with federal forces. The nation would remain legally at peace, while federal soldiers fought a war.

The nation fought the President's expanded war outside the Constitution. Only federal forces were used. The draft was expanded. New divisions were formed, cadred by regular soldiers, and filled with draftees. The regular Army turned itself inside out to meet its commitments. In response to the President's orders, our existing units were cannibalized to cadre new units. New officers were produced as fast as OCS classes with reduced standards could produce 2d lieutenants. Entire new divisions were created and sustained in combat through the rotation of replacements from the U.S. It was a magnificent management effort, and though it attenuated our leadership, its greatest fault was that it was outside the law. There was no mandate from the people to support it. Although the cause may have been just, the means were illegal, and the end could not justify the means.

Those Americans who understood the political situation were placed in an extremely difficult position. To support the President was to endorse usurpation of the constitutional powers. The President does not make strategy alone, he makes it with the Congress. Wars cannot be declared by the President, and the Tonkin Gulf Resolution was no declaration of war. Yet, to fail to back the President was to oppose him during the war, and to fail to back the home team composed of American fighting men. The media had to choose between fighting to preserve the Constitution, or backing the home team. It was a bad hand to be dealt, but in retrospect, it appears that the media played it well. By supporting the fighting man to the hilt, they undoubtedly could have created an artificial mandate of popular support for the President and his policy, but this would have led to a situation in which an illegal act was sanctioned, overlooked, ignored, and the Constitution sullied by the failure of the press

and the combined media to stand their ground and fight. Thereafter, precedent would show that manipulation of the Congress, the media and the electorate was an effective alternative to observance of Constitutional constraints.

The results of the media's dilemma are history. The media planted its feet, dug in its heels, and never let our people lose sight of the fact that the President had deceived them and their Congress, that a "credibility gap" had been created. The stand of the press exposed the futility of the President's actions that would have manipulated both the people and their Congress. The media was forced to choose an unpopular fight to support the Constitution in lieu of the easy and popular act of supporting the home team. It was a hard decision, but it had over two centuries of precedent to commend it, the fight for the right to representation, rule by law, and rule in accordance with the will of the people. It was a courageous and wise decision, and it defeated a President.

A second President then attempted to continue the existing war policy through apparently illegal acts, the invasion of Cambodia, unsanctioned bombing campaigns, a naval blockade; all measures that appeared to exceed the mandate of the people. Again the press rose up, and their attacks forced a troop withdrawal. The final battle of the Vietnam Constitutional Crisis was Watergate, which tested whether a President conditioned to act outside the law by waging illegal foreign campaigns could continue to govern through deception and domestic acts which rejected rule by law. The answer was no. The press stood and fought. Their courage and sensitivity to the grave Constitutional issues at stake are a great tribute to journalism in America. Our communications industry and our free press deserve to be recognized as the guardians of our Constitution. Had two presidents succeeded in deceiving and manipulating the people and the Congress, the United States could not claim to be a constitutional democracy today.

Reflections on Vietnam

Looking back now, it is clear why the press could not provide the type of support or the quality of coverage that our soldiers took for granted in World War II and Korea. The endorsement and encouragement of the media is a strong boost to the fighting man, and it could not help us in Vietnam, probably the loneliest war the U.S. fighting man has ever fought. By withholding its support of illegal policy,

our Constitution is intact and Vietnam became the war Americans had to lose. The American fighting man was withdrawn before the guns were silenced because the illegal policy and lack of mandate were finally recognized as insurmountable obstacles to a battlefield settlement. In retrospect, the U.S. victors of the decade of conflict are the media and the citizens who joined the media in opposition to the President.

We, the soldiers who fought in a struggle we could not see through to victory, must now have the courage to acknowledge that our sacrifice has been in vain. We must not fall prey to cynicism. We must recognize that the absence of media support from the homefront made possible the rejection of autocracy and the continuation of our Constitution, which have resulted in the preservation of our democracy. Those of us who fought without the encouragement of our people might pause and ask ourselves if we are guilty of disloyalty to the media. If so, perhaps we owe an apology to the media, for it appears that they are not the traitors of the fighting man, but rather they are the saviours of the Constitution. Theirs was a hard hand to play, and they played it well. Few of us would have cared to swap roles.

What of our Army that has turned itself inside out, that fought when the odds were great, and that sacrificed when sacrifices could not be acknowledged by the nation? What of the countless units and soldiers that did double and triple duty, soldiering without trained leaders and managers in Europe and wherever U.S. troops are stationed, so that new units could be formed by federal cadres? This too was part of the price of Vietnam, as were the intense drug and racial problems which haunted an over-committed and unpopular army. What of the massacre of the Calley Platoon? It has all been a part of the same legacy, and it represents untold human misery and personal sacrifice. It is the price of flaunting the Constitution, of pushing the federal forces beyond the limits which men and institutions could sustain.

Negotiations With the Press

What of the proposals of General Davis concerning negotiations with the Press? We can reply to these proposals by saying that in a constitutional democracy the military does not negotiate with the press. They are not equals, and they do not enter into any agreements as to truth, nor do they accept any cease-fire. When the military has the power to define truth, to agree to a party line, and to work

out mutually convenient positions with the press, the democracy is dead. The military is only equal to the spokesmen of the people in a dictatorship. In the constitutional democracy, the military plays no role in the government, and it does not participate in power sharing in the society. It is the servant of the state. The traditional role of the U.S. military is outside the realm of politics, and there it must remain.

Having presented a definitive contrast between attitudes of media and military, we must pause and



remind ourselves that the views of the media concerning the Vietnam Conflict presented in this article do not represent the only media views of the conflict, any more than my views of ARVN represents the only views in the U.S. Army concerning the nature of our allies in South Vietnam. Individual editors and reporters made individual assessments of the Vietnam Conflict, and these views found their way into print. The significant point to be made here is that the two conflicting views of the conflict presented in this article were both based upon a considerable body of supporting evidence, they were both widely held, and they were largely mutually exclusive positions. Thus, committed segments of the military and media have found themselves on opposite sides of a highly charged emotional issue from which compromise positions have appeared to be unacceptable. In the aftermath of Watergate, the invaluable contribution of the media is now apparent

and it is incumbent upon those of us in the military, who have earlier rejected the media position, to re-examine our position and to acknowledge the contribution of the media, as well as the constitutional commitments which appear to have shaped their reporting.

Where to from Here?

Having lost the conflict America had to lose, our Army has begun the business of repairing the ravages of an illegal war upon the institutional structures of our Army. As we continue this task, we must have the courage to look objectively at hard questions. We must continue the assessment of the racial hatred and spiritual problems that mushroomed in our ranks during the period our Army was stretched too thin, and leadership was inadequate for the needs of our soldiers. We must accept *My Lai* as a failure of those of us who wear the Army uniform to correctly spot the danger signals of racial hatred, and to effectively combat that hatred before it is too late to avoid the tragedy. We must recognize the responsibility of those of us who wear the uniform to insist upon a divorce of the Army from national politics. This includes resisting illegal political shortcuts and questionable reforms that attempt to show short-term savings amid great publicity and achieve long-term damage. Our approach must be firm but simple. The professional soldier is dedicated to strengthening our Army and insuring its readiness to defend the nation should crisis emerge, but our military leadership must steadfastly refuse to accept any solutions that would draw the soldier into politics. Failing in this responsibility, our leadership must be prepared to accept the final sacrifice of resignation from the service.

Ours is the spiritual burden of the fighter, whose cause has vanished. When political leadership enthalls our people with eloquent proposals for grand crusades, let us remember the human wreckage that lies scattered along the path of our recent foray. The soldier must redeem in blood the pledges of the politician. Thus, the leader of our soldiers has an obligation to represent the interests of those who must sacrifice themselves for their country. If the political leadership has overstepped the bounds of the Constitution, or is accepting risk unseen and unacceptable to the nation, then the military leader must present the unseen case to his political superiors in the name of each of the countless men, not yet in uniform, whose lives and fortunes are committed by the brave words of those who shall shed no blood.

When next a military candidate for a high office is asked if he is prepared to loyally support the programs of an administration, his answer must acknowledge the soldier's responsibility to support administration programs; however, the general officer must make clear his responsibility to level at all times with both the chief executive and the Congress, inasmuch as both are entitled to the loyalty of our soldiers. The final loyalty of each soldier is to our God, our people and our country, and the military leader of our soldiers must remain outside the political arena, without a mortgage on his soul to any political party or pressure group.

One of the most difficult problems that lies ahead is the problem of overcoming the strong animosity toward our Army that is a legacy of Vietnam. This problem can only be overcome with patience and understanding. It is a problem that is closely related to the swing to the left on campuses that was a natural reaction to the emergence of the autocratic, illegal, and finally unsuccessful political leadership that temporarily led the nation. The return to more moderate political views can only occur gradually as Americans regain confidence in their institutions. The inexperienced intellectual who finds escape in neo-Marxist solutions may well be a victim of the unconstitutional ventures of irresponsible national leadership. We must give our people reason to trust the military as true servants of the will of the people. We must aid in the rediscovery of the sound values of American tradition that were discarded in over-reaction to illegal policy, and we must understand that moderation and self-discipline of the U.S. military is a powerful example to men around the world seeking viable alternatives to dictatorship along the road to modernization.

If in the days ahead we must criticize our press, then let us agree that their offense is having loved too much. In the intensity of idealistic commitment, balance appears to have suffered, yet their ability to recognize the dangers to our Constitution has preserved a priceless democratic heritage for yet another generation of Americans. As America now enters into the third century of her national existence as a democracy, the nation must set aside the anguish of partisan discord recognizing the deep commitment of all parties to our democracy. We must recognize that the intensity of our love of democracy has produced generous acts and great sacrifice, even as it simultaneously produced wounds, whose scars continue to haunt the body politic. The soldiers serving in Vietnam were long convinced that they were serv-

ing a democratic cause, just as the media saw their cause as just. Recognizing the deep love of our democracy that is still deeply rooted in our society, we must seek a new national consensus, which alone will permit a national strategy for a greater America to emerge.

As we work, let us recall that two centuries of effort proceed us. To each worker, the problem is seldom small; the resources are never adequate; the future is always clouded; yet our people have built a great nation, 200 million strong. The vitality of our people rests upon the imagination of its sons and daughters, not in large armies or expensive material resources. Therefore, let us work with determination and faith, for the final verse of the American epic has yet to be written. As we work, the future shall become the present, and the present shall become the past. As we move forward into the uncertainty of the future, let us have confidence. Never have our people possessed greater opportunity. Never before has our country been able to unleash the creativity of its many subcultures, its diverse tongues, and both of its sexes. In the face of the great change that engulfs us, we can plant our feet in one place and oppose change, with fear as our guide. Or we can move forward swiftly with faith in God, our people and our country; and our destination shall remain unknown. The first course is that of the reactionary; the second is that of the builders of tomorrow.

Great events can occur in humble settings, for great events are the product of the intellect, not the product of majestic settings. We, in the U.S. Army, are a part of a new America that is emerging from apparent disorder. Let us recognize that within our own ranks, we shall contribute to a greater and better America, if we have the courage to help mold our democratic dream into reality.



LTC ANDREW P. O'MEARA, JR. was commissioned in Armor in 1959 upon graduation from the U.S. Military Academy. A CGSC graduate, he has served with the 1st, 3d, and 4th Armored Divisions; as an advisor to an ARVN cavalry regiment and as a member of a U.S. Armored Cavalry Regiment in South Vietnam. Colonel O'Meara is currently commanding the 1st Bn., 67th Armor, 2d Armored Division, Fort Hood.

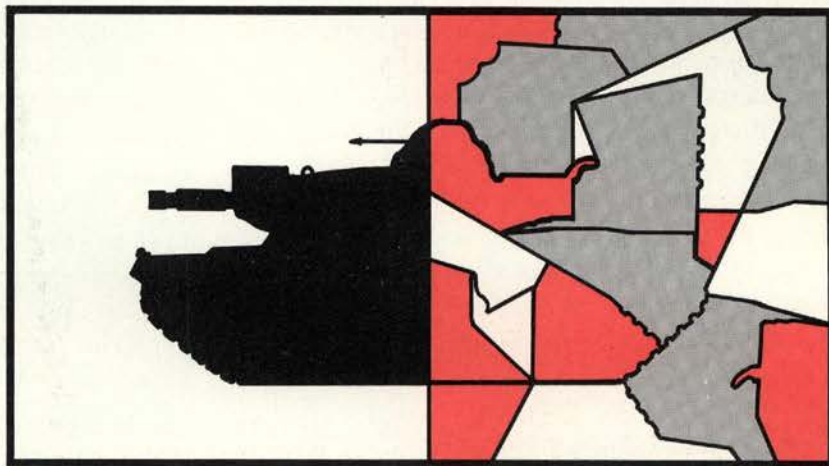
CAMOUFLAGE and DECEPTION

by 1LT Stephen W. Miller, USMC

An overwhelming force of tanks and mounted infantry deploys into attack formation on its route of advance. The commander is confident of success. Extensive surveillance efforts indicate only scattered forces will oppose him. Even detailed aerial photo analysis, using the most advanced methods, has only reconfirmed what visual reconnaissance has noted. The advance element looks long at the tree line before them as aerial observers overhead search its shadows. With no indications of activity, they pass on. Soon the main body moves into sight. All intelligence indicators have held true; the advance has received only sporadic artillery and air attack thus far.

Suddenly, with the forward units not more than 300 meters away, the "clear" treeline explodes with an avalanche of devastating fire. On all sides, vehicles shutter and burst into flame as they are hit. The infantry dismounts only to advance into a curtain of small arms fire that comes, seemingly, from nowhere. The attacking tank commanders desperately search for targets, but each target is instantly obscured in a cloud of smoke of an enemy round that lands too close. When the smoke finally clears, the target is gone. It's as if the trees themselves are the source of the murderous fire. Surprise is complete; the advance falls into disorder. With heavy losses, the column withdraws to lick its wounds.

Is this scenario realistic? Could it happen? Certainly! And it is not only possible, but also vital



that we be able to recreate it, faced as we are by overwhelming forces in almost every possible deployment area. The key lies in a renewed emphasis of the application of camouflage and deception at all levels of organization.

Camouflage and deception have been, throughout history, a recourse for the overwhelmed but shrewd commander, enabling him to gain a more equal balance of combat powers. They are a haven to any force faced with massed firepower that is a seemingly unalterable threat to survival. The use of camouflage must extend beyond the front lines, deep into the "rear areas" and hinder the enemy's ability to gather intelligence "indicators" that will point to our course of action.

Today, most countries faced with manpower and economic resource limitations, are turning to smaller, more sophisticated armed forces to accomplish the same mission. Yet, this streamlining and large scale technological sophistication has made each man and piece of equipment that much more vital to the total effort. Not

only are these assets more expensive; but they are fewer. Similarly, weapons systems have grown more efficient. However, no delivery means can be any more effective than its supporting surveillance and target acquisition effort. Without a target, the most devastating and accurate weapon is worthless. Today, we face a surveillance threat which goes beyond the traditional visual, photographic, and infrared (IR) means. It also encompasses the use of radar, thermal detection, microwaves, and ultraviolet photography which can be air, ground, or satellite based. With the advent of laser- and TV-guided projectiles, wire-guided missiles, radar bombing, and advanced day and night sighting systems, target acquisition has been developed to the point that anything seen and recognized can be destroyed.

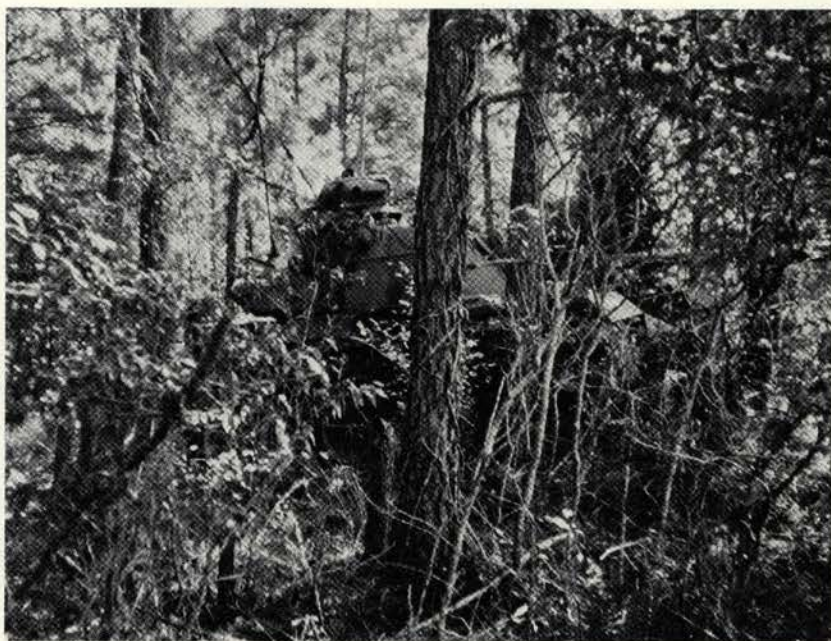
Yet, all of this sophisticated hardware has one common denominator. Ultimately, the effectiveness of these devices rests on the human eye, either directly in application by an observer or gunner, or indirectly by an imagery inter-

preter. Thus, the reason for camouflage is not so much to be invisible, but rather to be inconspicuous, to resemble the surroundings and most of all, to *not* appear to be that which we are. Even if found, one must still present the most difficult identification problem possible and foil reacquisition. A pilot who can't find specific targets, even knowing their general location, cannot be effective. It is that confusion, that hesitation, that should be fostered in a camouflage effort to gain time — time to react, to gain surprise, to enhance our own survivability and thus, to increase the effectiveness of the combat power presented to the enemy.

Presently, the four areas of emphasis in camouflage development are: camouflage pattern painting, camouflage nets and disruptors, smoke and aerosol systems, and decoys. The majority of the initial development effort has been conducted by the United States Army Mobility Equipment Research and Development Center (MERDC), at Fort Belvoir, Virginia. Still, the very extent of the threat requires that *every* individual, regardless of rank or service, be acquainted with these techniques of camouflage to insure its total effectiveness.

CAMOUFLAGE PATTERN PAINTING

The importance of camouflage became especially recognized by United States combat units in World War II. Unfortunately, most devices were locally designed and prefabricated. In 1944, the U.S. Army Engineer Board, the forerunner of MERDC, published an evaluation of all concepts then in field use on tactical vehicles. This report recommended the production and issue of brackets to all units and the adoption of large



A camouflage pattern painted M-48A3 tank in the winter color scheme positioned in a Virginia treeline.

scale camouflage pattern painting as the most effective and experience proven methods. With the war's end, though, its recommendations were never fully implemented.

Today it is back bigger than ever. MERDC, after evaluating patterns of various countries, developed a four-color pattern of its own, which has been adopted by the United States Army for use on all major tactical equipment. Although pattern painting is not a cure-all, it has been found that it will significantly reduce the detectability and recognition signature of a military object. When pattern painting is combined with proper siting and other camouflage, more complete effective concealment is possible.

The MERDC design provides a pattern that will accommodate any geographic or seasonal change by changing one or two colors. The painting process is designed to be accomplished at the small-unit level with a minimum of special training or equipment, thus facilitating both application and touch-

up. To date, not only is the Army using pattern painting, but the Air Force is considering its merits, and the Marine Corps' Fleet Marine Force, Atlantic units have initiated selective painting for evaluation. Results thus far have been impressive, and costs per unit has been small compared to the protection gained.

The extensive field testing by both the Army and Marine Corps has covered aspects of ground, air, and photo detection. On the average, figures indicate a 30 percent reduction of detectability. Significantly, in a "hide and seek" scenario of low altitude, attack helicopters versus stationary camouflage pattern-painted tanks, only one vehicle was detected in four situations. That detection, the pilots' admitted, was due to the sighting of tracks rather than actual vehicle identification. In ground testing, an Aggressor tank approached to within 300 meters before he detected a camouflage-patterned tank which was positioned just inside a treeline. No method other than pattern painting

had been used in its concealment.

The pattern-painting process lends itself to further development. Presently, both near infrared-reflective and infrared-absorbing paints are available. By reflecting infrared light similar to chlorophyll in vegetation, the IR-reflective paint used on ground equipment will reduce detectability when photographed with IR camouflage-detection film. The IR-absorbing paints utilized on aircraft markedly reduces their IR signature to IR-sensitive anti-aircraft missiles. Additionally, a texturing process to reduce glare, a radar-absorbing base paint, and a thermal-insulation paint are being investigated.

Also, camouflage project personnel are taking a serious look at the present procedures for marking vehicles and equipment. Although they are an aid to administrative processing, the present markings are incompatible with effective camouflage and remain a prime recognition feature for the enemy. A quick glance shows bright yellow letters, or red and white markings, which incidentally, always seem to make superb aiming points for enemy gunners. In our attempt to be inconspicuous, our present markings are self-defeating. In combat, it rarely pays to advertise.

CAMOUFLAGE NETS AND DISRUPTORS

The use of screens and nets for camouflage is decades old and time-proven. Unfortunately, the burlap and cotton jute nets currently in stock are just as old. Although our equipment has changed to face new threats, the primary means of concealment has remained unaltered for 50 years. Observers' comments have noted the habitual use of nets by our allies in joint exercises. As soon as a vehicle halts, it is covered

and camouflaged, while our nets sit in storage or hang in a half-hearted effort of concealment because they are too difficult to put up or move rapidly.

However, this situation is soon to be remedied. A new lightweight camouflage netting of nylon and synthetic construction is now available. The netting is reversible and is effective in either wooded or cultivated terrain. These nets are termed modular in that they contain all items needed to easily erect them, including poles, stakes, and guylines. The nets can be combined and linked to increase their coverage. Above all, these modular camouflage screens have inherent infrared-reflecting qualities, and are manufactured to either scatter radar impulses, thereby returning a signature compatible with foliage surroundings, or to be radar transparent.

The radar-scattering capability is important to ground equipment that is subject to radar identification. The purpose of the radar-transparent net is to finally provide a camouflage screen that may be used over our own radar transmitters without degrading their range or performance. Field tests have confirmed their effectiveness. Desert and snow screens are also being evaluated. It may even be possible to include properties in nets that will obscure the present thermal signatures of potential targets. Thus, through proper camouflage screen employment, a broad band of surveillance sensors may be defeated.

In fact, nets are only one type of disruptor. This term has been adopted to cover any concept that provides for a change in an object's identification signature by altering its shape or configuration. Nets are not applicable solutions to all our camouflage problems.

How do we conceal a *Hawk* missile battery, a *TPS-22* radar antenna, or a main battle tank or self-propelled gun, and still allow it to operate? Ideally, they should be able to search and fire without ever having to break camouflage. Disruptors provide for this camouflage capability without detracting from the effective operation of the system.

Various forms of simple and complex disruptors are being developed. Some use artificial means, while others combine natural foliage. Examples are: suspension "skirts" for tracked vehicles (which could also be additional armor), foliage "umbrellas," retractable disruptors, foam decoys, and brackets. The camouflage "umbrellas" have been fielded in Sweden for use by artillery and missile units. They are fixed into holders on the weapon and extended; weapons and fire control systems are then able to be fully traversed and serviced while concealed. During field operations, aeroscouts, though passing within 500 meters in low flying observation helicopters, were unable to detect active *Hawk AAA* missile batteries, which were utilizing nets, paint, and disruptors. More importantly, even when equipment is detected, specific recognition of type or purpose is still difficult, because of the changed silhouette created by disruptors.

Of special interest is a disruptor concept utilizing natural cut vegetation placed into "U" shaped brackets. Practical experience has shown that foliage will not be significantly disturbed by vehicle travel or routine crew actions, nor do properly placed brackets hinder operations. If used in conjunction with pattern painting, it could as it did in 1944, aid in solving our camouflage problems. Of course,

the branches must be changed with time. While the concept has every limitation caused by using live vegetation, it is effective and could be applied almost immediately as a low-cost interim solution.

SMOKE AND AEROSOL SYSTEMS

Up to this point, the concepts addressed have been meant to maintain passive concealment. However, at times these measures will prove impractical or no longer effective. A missile battery convoy in transit to a new location, or the discovered fuel farm under air attack can no longer rely on nets to aid their survival. In these cases, a system is required that will act as an attack deterrent and also counter target acquisition. Both capabilities are available by applying smoke/aerosols to the situation.

Generally, the smoke screen or canopy is a last resort providing instant concealment against an obviously initiated attack after all passive measures have been ineffective. Smoke may be adapted to defeat the air or ground-launched weapon, visual- or laser-guided weapon, and to distort radar images and various acquisition systems. Smoke's greatest advantage is that an obscured target lowers a weapon's hit probability and accuracy. The time gained by the screen will enable the target to take evasive action undetected. The tracker suddenly loses visual contact with the target, or the sensor-guided weapon will break its tracking "lock on." An attacker who has lost his element of surprise, and is deterred in the first moments of attack will find the odds much less in his favor in the next attempts.

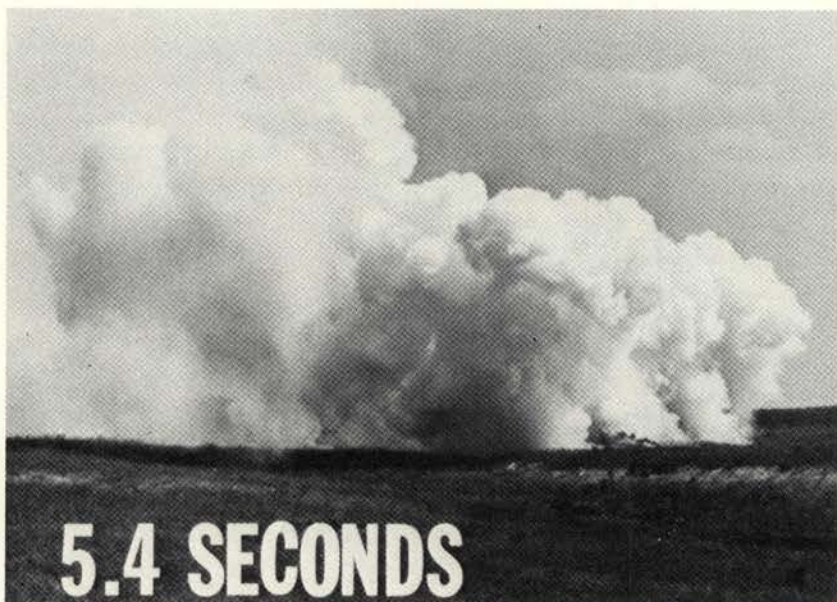
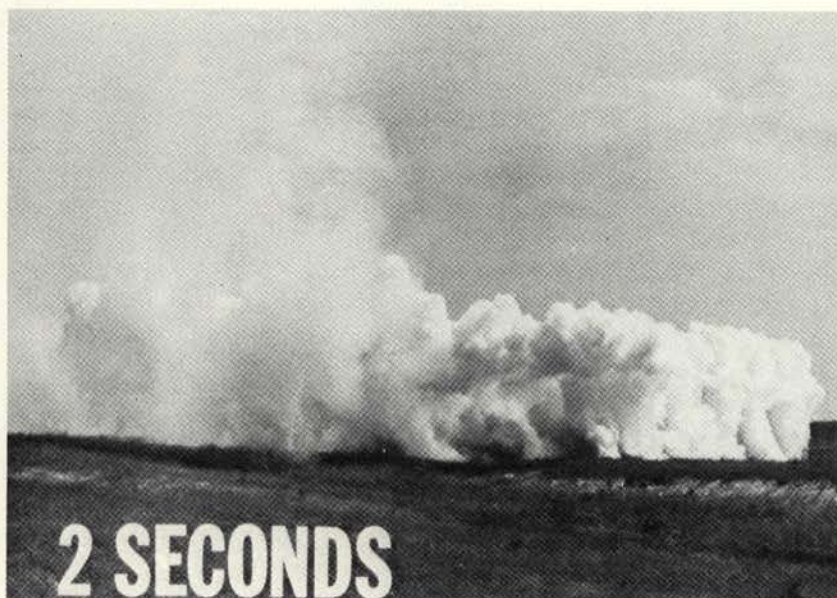
But even though the smoke screen is "instant" (it can be created within less than 2 sec-



onds), the smoke should not linger so as to hamper counteraction. New systems are being tested to provide instant screens that dissipate within minutes. One of these uses beer can-sized (2½-inch diameter x 5-inch) aerosol disseminators (AD's) that expel any of several atomized chemical agents with various defeating properties. The AD's can be mounted in banks along the sides of any vehicle or equipment and initiated as required when under attack to produce a dense smoke that, in

seconds, will obscure the vehicle for up to 2 minutes, enabling it to maneuver or react by returning fire or moving to cover. Additional smoke screens may be initiated as required until the attack is effectively neutralized. A convoy disseminating its own overhead smoke canopy (the rapidly rising smoke insures optimum visibility at close to the ground level) could force attacking aircraft to fire blindly, oblivious to the evasive actions of the convoy, aiding its survival.

Another system, the "wall of



aerial smoke," is designed to deter aircraft delivered or airborne-observed fires on a semi-fixed installation. A series of small-caliber rockets launched into the path of the attacking aircraft detonate at various altitudes creating a smoke wall before the attacker in seconds. During tests of the system, no attacking pilot would fly through the wall, and all acknowledged that it would have seriously affected target engagement and ordnance delivery. These walls could be command initiated on any likely

approach and, combined with effective ground antiaircraft defenses, could be utilized to channel attacking aircraft into kill zones. The smoke rockets are portable and small enough to permit a large number to be mounted on each carrier/launcher, giving a capability to erect smoke walls repeatedly. It would also be feasible to tie the smoke wall into our air-defense network with central control to insure more efficient coverage.

These applications, along with further development of assorted

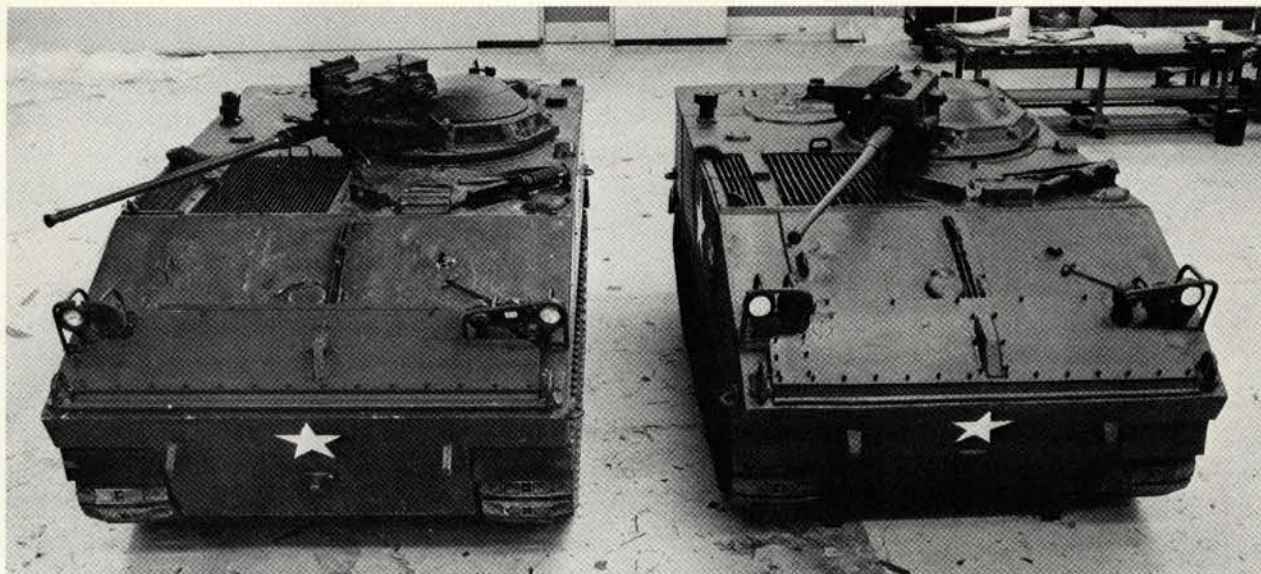
screening smokes, canopies, and walls with more efficient aerosol agents, will give our forces a greater capability to reduce their time under effective enemy fire than they ever had before. Smoke is a concept that warrants careful watching and prime consideration. It is not only a relatively simple, inexpensive, and effective solution to a very sophisticated threat; it is also amenable to further development.

DECOYS

An integral part of our "total concept" of camouflage efforts is the use of deception. For instance, it would be difficult to completely conceal an airfield, although its components can be made less conspicuous. Certain objects are associated with all airfields, and the lack of these specifics on an obviously active field can prompt an enemy to further surveillance efforts. This itself is counter to our main aim.

In this case, one must lull the foe into confidence in his intelligence while actually deceiving him as to the true location of our facilities. Here decoys will play a starring role. One endeavors, by using decoy aircraft and equipment, to distract the enemy's reconnaissance and mislead attacking aircraft by giving a more obvious target during those few seconds he has to choose his target. Thus, with operational equipment effectively camouflaged, its imitators are placed in realistic, somewhat concealed positions to absorb the enemy's attention. Additionally, decoys may provide deception as to strength, deployment, and possible intentions.

With their utilization in the recent October War, decoys are again in the limelight of desert warfare, just as at Alesmain in



An M-114 and its flexible foam decoy. The decoy is on the right.

1943. However, the techniques have, in many ways, become much more sophisticated. Decoys may be made of prefabricated cloth, plastic, or flexible foam that is compressible to 10 percent of its original volume, and made IR reflective or given IR and thermal heat sources, or they can be just locally constructed field expedients. As with every other camouflage system, decoys can only be truly effective when used in conjunction with other measures, and no method can be any more efficient than the personnel who establish and maintain it.

TRAINING AND AWARENESS

It is vital that every man realize that even the best countersurveillance system can be made totally worthless if it is improperly sited, or sound camouflage techniques are ignored. All must realize and be conditioned through realistic training and practical field experience that they are a target, and what they do or don't do as an individual, as well as a group, is significant. Any activity that doesn't seem to fit, a flash, an unnecessary movement, a track, can be enough to warrant a second

look by any observer, and that could be enough. Camouflage discipline and techniques, both day and night, must be practiced continually until they become reflex actions. Our efforts will only be successful when there exists a constant camouflage awareness; it isn't a sense that can be turned on and off, it must be stressed continually until it becomes ingrained in our operations.

No camouflage can escape detection indefinitely, but when wisely used, each technique aids our overall countersurveillance effort and raises the effectiveness of our combat power. Military analysts today point out that the American public will not tolerate high personnel losses or any high cost-conflicts, nor can we afford them. Camouflage enhances our survivability and grants a potential for using a smaller more cost-effective force to accomplish our missions.

An enemy who does not know the dispositions or intentions of his opponent is greatly disadvantaged. He must spread his efforts or choose one course of action without sufficient supporting intelligence. It is our option to choose where, how, and when we will act — to mass our forces against his

weakest point and with speed and surprise, smash his forces before they can react. Thus, through camouflage and deception, we can take the initiative, and though disadvantaged in numbers and faced by sophisticated weapons systems, it is still possible to negate the enemy's effectiveness, minimize our losses, and apply our decisive combat power to win.



1LT STEPHEN W. MILLER was commissioned in the Marine Corps in 1972. He has served as Platoon Commander and Intelligence Officer with the 2d Tank Battalion; and with the Force Troops Staff. Lieutenant Miller, a qualified aerial observer and intelligence officer, has been both a project and briefing officer in the Marine Corps' recent camouflage development efforts. He is currently assigned to the 3d Tank Bn., 3d Marine Div., Okinawa.

1975 ANNUAL ARMOR CONFERENCE

PRESIDENT'S OPENING REMARKS

by MG John K. Boles, Jr. (Ret)

On behalf of the Armor Association, I would like to express our appreciation to Fort Knox, the Armor Center and especially, of course, General Donn Starry, for hosting this 86th meeting of the Armor Association. It is most important that our diverse and progressive organization meet each year in order to exchange ideas and improve our own capabilities to serve our country. As indicated by the many, many insignia on the uniforms of the Armor officers out here in the crowd, we may be tankers, we may be armored cavalry, we may be flyers, but each of us calls ourself Armor and each of us has the mission of move, shoot, and communicate. No other branch of the service can claim that. We have the same mission whether we travel through the air or bust through barriers, or sneak around the flanks of the enemy, and of course, the infantryman or the artilleryman or the engineer who travels with us is actually teamed up and integrated with the armor team and is part of the armor team. And, if we ever attempted to fight a war, as was recently done in the Middle East, without being completely integrated as an armor team with artillery, infantry, engineer, etc., we would suffer the same unnecessary casualties that were suffered in that war. Meetings such as these serve to integrate our thoughts, our tactics, our equipment, our personalities, so we can fully exploit the spirit

and the capabilities of armor.

So, again, I am very, very grateful to General Starry and his people for hosting our meeting this year and I trust that each of us will receive a great deal of benefit from mingling and exchanging ideas and listening to the fine presentations which we will hear from this stage and also out in the field this afternoon when we are not restricted, as some of the fly boys are, because of a little bit of rain and little bit of mud.

I would like to present some of our distinguished guests here today. So when I read your names, if you will please rise and expose your smiling face to the audience, I would appreciate it. But hold your applause please until they have each been introduced.

General James H. Polk, past president of our association, a real old tanker, LTG Tom Dolvin, LTG John M. Vessey, Mr. Frank Shaw, DOD, MG Robert Baer, MG Julius Becton, Commanding General, 1st Cavalry Division, MG Robert W. Grow, LTG Robert M. Shoemaker, Commanding General, III Corps and Fort Hood, MG Raymond E. Mason, MG Morgan Roseborough and MG George S. Patton, Commanding General, 2d Armor Division.

Now I'll turn the stage over to our experts. Thank you very much. Again, we are very grateful for the opportunity to be here at Fort Knox.



1975 ANNUAL ARMOR CONFERENCE

KEYNOTE ADDRESS

By Major General Donn A. Starry

Commandant, U.S. Army Armor School

The first part of our meeting is styled as a keynote address. If we have a keynote message it concerns how we believe the Army should get itself ready to fight the first battles of the next war. Therefore, I will describe for you what we are doing, and the logic behind what we are doing, because it pervades almost everything else you will hear.

For a number of reasons we believe that wars of the future will probably be shorter and more violent than in the past. So the important task of the U.S. Army is to win the first battles of the next war, because those may be the only battles, as demonstrated in the Middle East in October of 1973. In order to decide what we must do to win the first battles of the next war, we must first describe the modern battlefield, and how the Army should expect to fight on it.

The single most impressive fact about the modern battlefield drawn from observations of the 1973 Middle East War and analyses of what might happen in Europe, is that we are faced with masses of weapons.

We don't necessarily believe all wars are going to look like the October War, but some numbers from that war outline the dimensions of the problem. (See figure 1.) It's important to point out that in the 12 violent days of that war, half of all combat vehicles on both sides were destroyed.

We were fairly well along in an analysis of the modern battlefield in October 1973, and what took place that month on the Golan Heights and in the Sinai served as a dramatic demonstration of what we thought we already knew about modern battle. Now, fighting outnumbered is a big problem. There are about a hundred thousand tanks in the world; as nearly as we can figure, about sixty thousand of them are of Soviet design or manufacture. So we are not only outnumbered at the outset but there is no

way for our factories to turn out enough equipment to catch up, let alone get ahead. In addition to the problem of numbers, modern weapons are of vastly increased lethality and effectiveness.

That's not all bad. Figure 2 shows four battles in October. The first column is the posture of the Israeli Defense Force in each battle — one night attack and three defenses. The second column shows the total number of tanks involved on both sides. The third column shows the odds at the beginning of the fight, Israeli versus Arab. In other words, the Israelis were outnumbered by 2 to 1 up to 6 to 1. The last column shows the loss ratios. Note that the Arabs, even though they outnumbered the Israelis at the beginning of one battle 2 to 1, lost at the rate of 6 to 1. In another battle the Arabs were totally wiped out. In still another they lost at the rate of 50 to 1. In almost every battle of that war, exchange ratios were very much like those shown. The point of this is that there is no pattern. Historically, we have described tank battles using mathematical formulas derived from the Lanchesterian equations traditionally used to describe the mathematics of aerial combat. Lanchester's laws, as most of you know, say that the side that is outnumbered at the beginning is foredoomed to defeat. Based on our preliminary examination of 15 to 18 battles in the October War, we analyzed about a thousand tank battles, and can find nothing in the history of mass tank warfare to validate the prediction that the side outnumbered at the beginning is going to lose. As a matter of fact, it turns out that the side outnumbered at the beginning seems to have a better chance of winning than does the other side.

We think that is very encouraging. This is so because our potential adversaries have decided that the way to win is to just outnumber the other fellow and try to overwhelm him with masses. Since we

know we will have to fight outnumbered, we need to develop some convictions about the fact that it can be done, and then we must figure out how to do it. So what we would like to describe is how to win outnumbered.

On the modern battlefield there are really three wars. The first is the General's war, and the General's first problem is to find the enemy. That is, get forces on the battlefield to find the enemy early enough and far enough away from his own forces so that he can do something about it. What does he do about it? He moves. He moves sufficient units to generate enough force in time and space so that, if he is attacking, at the point of attack he outnumbers the enemy about 6 to 1; or, if defending, he creates a force to insure that he is not outnumbered by the enemy attack by more than about 3 to 1. If his units use tactics I will describe for you in a moment, the general should expect them to extract an exchange ratio on the order of 4, or 5, or 6 to 1 from the enemy. If that can be done, we think he has a good chance of winning the battle. That is the General's war. It is a war of movement. It is a

war of mental agility. It is a war of command and control.

For example, a division commander defending a front of about 60 to 80 kilometers against a Soviet-type breakthrough attack — two motorized rifle divisions on a front of 7 to 11 kilometers, has to bring about eight of his 11 battalions together in sufficient forces so that he is not outnumbered by more than 3 to 1.

Meanwhile what happens out on the flanks, in those other two or three battalions of that division, now covering the remaining 50 to 60 kilometers of divisional frontage? No doubt that is going to be a very sporting war out there. But one element that will help tremendously is air cavalry and attack helicopters. As was the case with finding the breakthrough attack, the only way to find the enemy on the flanks far enough away to move units against a secondary attack is to use air cavalry — backed up by attack helicopter units — to hold, or block, while moving forces in there on the ground to do something about it.

The second war is the one we can call the Colonel's war. The Colonel has to take forces the General moves into the battle area and feed them into the fight in such a way that they get where they are supposed to be, and get there in time to be part of a defensive, or an attack scheme, and win the battle, given the odds that the General has been able to generate.

The critical part of battle, which we call the Soldier's war, is a war of lethal weapons and masses of enemy; a war of the combined arms. Now by improving arms and equipment we think we might improve the Soldier's fighting capability by about 10 percent. However, we believe most strongly that we can improve our fighting capability by 100 percent through training. Later today we will demonstrate for you some training devices which we believe will help us train soldiers better to do their job in their war.

The Soldier's war involves lethal weapons; understanding the lethality of those weapons is important. Today's *M-60A1* is about 10 times as effective as its World War II counterpart, the *M-4*.

In World War II, tankers had a 50-50 chance of hitting with the first round at 700 meters. That distance increases to about 2,100 meters with *XM-1*. And, of course, today's antitank guided missiles have a good first round hit probability to ranges of about 3,000 meters.

If we sweep those extended ranges over the area

	Tanks	APC's	Arty Tubes	AD Btry Deployed
ARAB	4000	3000	3000	150
ISRAELI	2000	4500**	800	10-15

*All figures approximate

**Includes half tracks

Figure 1. *Combat Vehicles Employed in the October War*

IDF	Total Tanks	Odds IDF: A	Losses IDF: A
NITE ATK	870	1:2	1:6
DEFENSE	180	1:1	-- TOTAL
DEFENSE	700	1:6	1:6
DEFENSE	100	1:2	1:50+

Figure 2. *Four Battles in October*

the tank commander can see, we find that today's tank commander controls an area 10 times the size of his World War II buddy.

Putting it another way, in World War II, one could count on a hit out of about 20 shots. Today we can hit with one of every two shots. And with XM-1 that will increase to two hits out of three shots.

The air over the battlefield is also filled with lethal munitions.

The range and effectiveness of modern air-defense cannon and missile systems make the air over the forward battlefield a difficult place in which to operate. In order to fly there, one must avoid or suppress these weapons.

The lesson in all of this is that tanks can't go it alone, it takes the combined arms team. Generals, colonels, and soldiers have to understand the lethality and masses of weapons they face, and share a common outlook on what must be done about terrain, enemy, weapons, movement, and suppression in order to win when fighting outnumbered.

Movement on the Battlefield

First, and most important, how do we move around on a battlefield like that? Any scheme of movement must recognize the lethality of modern weapons; that tells us that we must use the terrain — get down in the terrain, seeking protection from enemy long-range observation and fires. Movement must be on covered routes from one covered or concealed position to another; moving elements must always be overwatched by some other element in position to bring fire to bear on weapons which fire on the moving element. And so, moving on the battlefield is governed by terrain and the enemy.

When enemy contact is not likely, we move by traveling. Picture a tank platoon moving along. One section leads. One follows. They may move fairly well spread out, or close up into a column-like formation for a defile, then spread out again. Both sections move. If the platoon leader thinks he is going to meet the enemy, he begins to move in traveling overwatch. Here the overwatching section always moves from one position to another in such a way that it can cover the other section if that section comes under fire.

If the platoon leader really expects to meet the enemy, but isn't exactly sure where he is, movement is by bounds. This is the slowest way, but the surest way. The platoon always finds the enemy

with the least force possible, so that in that first 15 to 20 minutes of battle, when most losses occur, a lot of people are not killed unnecessarily because they just bounded out on the forward slope of a hill.

Once contact is gained, it is a simple matter to move directly from bounding overwatch to fire and maneuver. The only difference between bounding overwatch and fire and maneuver is that overwatching and moving elements open fire.

The transition from movement to contact to hasty attack to deliberate attack is therefore very smooth. There is no mental gear shifting.

Now, the same thing is true with mechanized infantry — the dragoons. The mechanized infantry rifle squad consists of a fighting vehicle and a fire team. Normally, of course, a squad has 11 men, but, as all of you know, those 11 men will hardly ever be present for duty on any given day. There will never be 11 men in that track and we must recognize that. Therefore, the driver and one or more gunners man the fighting vehicle, and the rest of the squad dismounts under the control of the squad leader and forms a fire team. Normally, there is only one fire team. In the fire and maneuver, or bounding overwatch, at the rifle squad level the vehicle and its fire team work together. In the mechanized infantry rifle platoon, there are four fighting vehicles and four such rifle teams. The fire teams carry with them the antitank guided missiles and automatic weapons assigned to the squad. They take the most important weapons with them when they dismount, depending on how many soldiers there are to carry the weapons. Normally they are mounted. They may travel. They may move in traveling overwatch, when they think enemy contact is likely; or, when they expect to meet the enemy, they move by bounds.

And when they meet the enemy, they go into fire and maneuver and assault the objective. They dismount when forced to do so.

We use the same tactics in cavalry platoons, and the same principle applies to helicopters. Part of an attack helicopter unit may move traveling along a covered route; through a little draw covered by another element. Attack helicopter units also use traveling overwatch, bounding overwatch, and fire and maneuver. The point is this, the same tactics apply to every small combat unit on the battlefield. We can't find any exceptions, and the rule applies above ground, as well as on the ground.

Aircraft must fly nap-of-the-earth; the only way for them to survive is to operate in the ground battle

environment. They are just like another ground vehicle, but they happen to be 10 or 20 feet off the ground moving at 20 or 30 knots. They can't fly low level, and they probably can't fly contour in the forward area. So they must be down in the trees. Now, flying down there is difficult. Not everybody is skillful enough to fly down there. Not everybody is willing to fly down there. But it has to be done.

Major General C. J. LeVan at Fort Bliss has been very supportive of our efforts to get air-defense weapons forward in our battle array. As most of you know, threat armies use air-defense weapons such as ZSU-23-4's on the basis of one for every six tanks. And so, there are a lot of air-defense weapons out there. We don't have that many forward air-defense cannon, but our air defenders are very enthusiastic about using what we have, and using them well up in the forward area.

Summary

Now, to summarize what I have just said about movement to contact and attack. We move to contact, to find the enemy with minimum force; use covered routes; use terrain; key movements to terrain and the possibility of enemy contact — not likely, likely, or expect to meet him; then move into fire and maneuver for hasty or deliberate attack.

The purpose of all this is to break up the enemy's defensive system. If the General has managed to get forces together so that the odds are about 6 to 1 in his favor; the Colonel has fed battalions into the fight in an orderly fashion; the soldiers are down in the terrain, using their weapons to maximum advantage and minimizing their own vulnerabilities, enabling them to break up the defensive system; and the helicopters come in, go through the break, get in the rear, hit reserves, command and logistics installations — when all of this happens, we are convinced we can win outnumbered.

Now how do we defend in modern battle? Defense is a matter of understanding enemy weapons and tactics. Briefly, the important thing to know is how the enemy plans to attack by echelons.

In using terrain he must seize on every advantage that normally accrues to the defender. In fact, the only advantage the defender doesn't have is the initiative; he regains the initiative by attacking at some point in the defensive fight. But when he attacks he must do it in a little different way than it has been done before. As the enemy comes into the defensive

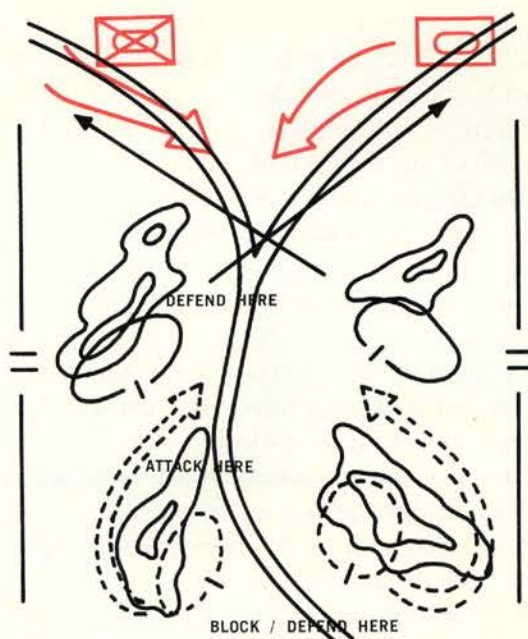


Figure 3. A Defensive Sector

area, the commander must have his units in position, probably behind a hill firing across the forward slopes of the next hills, so as to minimize their vulnerability and make maximum use of their long-range weapons capabilities. The defending commander should plan to counterattack, but only when he has a good chance of success. For when he attacks, he gives up many of the defender's natural advantages. He doesn't want to do that unless he can gain some advantage by it. He must plan to use smoke, suppression, and the counterattack to kill as many enemy as possible in sufficient time to get back into the next defensive setup before the second echelon comes along. He must know that 5 to 7 kilometers behind the echelon he is now in contact with, there's another; he must tidy up what he is trying to do in order to get back into position in time to meet the next echelon.

The Soldier's War, defense or attack, depends on teamwork and training. We pay a lot of lip service to training, but one of our serious problems today is that we all live in a hostile training environment. We have many programs, most generated by agencies that aren't concerned with how to fight, all pressing in on training time. Not many contribute much to combat readiness. All eat into commander's training time.

That sets the stage for what we are trying to do. The next speaker will tell you a little about what we are trying to do with cavalry and cavalry vehicles.



1975 ANNUAL ARMOR CONFERENCE

ARSV TASK FORCE BRIEFING

By Lieutenant Colonel David L. Funk

Chief, Test Branch, ARSV Task Force

The Armored Reconnaissance Scout Vehicle (ARSV) Task Force was formed at Fort Knox in March 1974 to reexamine, validate, or redefine the requirement for a ground scout vehicle.

Numerous agencies assisted in this effort. First, the Cavalry Scout Ad Hoc Committee (CSAC) was formed at Fort Knox to examine how best to organize cavalry formations to win the first battle of any future conflict. Concurrently with this study, the ARSV Task Force planned a Force Development Test and Experimentation (FDTE) and a Cost and Operational Effectiveness Analysis (COEA) to assist in selection of a future armored cavalry scout vehicle. A total of 14 candidate scout vehicles were tested and evaluated, both at Fort Knox, by the 194th Armored Brigade and at Fort Bliss by the 3d Armored Cavalry Regiment. Throughout the various phases of the study, both European and Mideast terrain and threats were played. User input was continually stressed both from the player personnel participating in the various tests, and by player personnel in the supporting map exercises. In addition, 500 cavalry officers and enlisted men, serving in CONUS and Europe, were polled to determine their thoughts on vehicle requirements and crew size.

Based on the results of the CSAC and the ARSV Task Force FDTE, a major MASSTER test was conducted in March of this year which compared the conceptual Armored Cavalry Platoon to the current H-Series Platoon through a series of demanding cavalry scenarios.

Using these tests and evaluations in a building block, step-by-step manner, the Task Force case was built for its final recommendations. The fact that the modern battlefield is dominated by the long-range, high-velocity tank cannon and long-range antiarmor missile systems was a major consideration.

This, plus the fact that the U.S. Army must learn to fight when outnumbered and win, led the Task Force to recommend a well-organized and well-equipped cavalry that can greatly assist in winning the first battle by:

- Detection and identification of the enemy at maximum distance from the friendly main body, thereby providing adequate warning and reaction time.
- Placing long-range missile and tank gun fires on the enemy force, slowing their movement, forcing early deployment, and identifying the location and strength of the breakthrough attack.
- Serving as an economy of force, using firepower and mobility to cover extended frontages and depths.
- And operating at night and in periods of poor visibility when other means of surveillance are of limited effectiveness.

The question then was, "*Can these goals be accomplished with present equipment and organization?*" To answer this question, let's look at the heart of cavalry — the scout — and then the organization of which he is an integral part.

The Search for a Scout Vehicle

Since the mechanization of cavalry, the search for a better vehicle for the scout has been continuous.

In 1973, General Abrams made the decision to replace the *M-114* with the *M-113* armored personnel carrier. Subsequently in 1974, based on results of the ARSV FDTE, progress was halted on the development of new scout vehicles. TRADOC further recommended that a scout version of the follow-on *Mechanized Infantry Combat Vehicle (MICV)* be developed as the scout vehicle of the 1980's. This

decision requires an interim scout vehicle until a *MICV/Scout* can be fielded.

Throughout the past 18 months of study, it has become clear that the requirements for a scout vehicle breakdown into five basic areas: mobility, firepower, protection, load carrying capacity, and commonality.

In mobility, the scout vehicle must be able to keep up with the main battle tank. Since the tank of the 1980's will be a very mobile one, the scout vehicle must also be highly mobile. Additionally, the scout must be able to swim typical water obstacles.

In the area of firepower, scouts must be able to provide overwatch for each other during movements. To provide the required overwatch, scouts must have available both a long-range, armor-protected anti-armor weapon, and a stabilized midrange, high-rate suppression weapon.

The third requirement — protection — is one that has been largely minimized in the past. Protection is required for the scout against the threat's massive suppressive artillery capability (152-mm shell fragments), as well as against common light armor-piercing ammunition (14.5-mm rounds). The scout vehicle must provide some protection to the crew from antipersonnel mines. In order to protect his movements, the scout must also have a smoke capacity.

The scout vehicle of the 1980's will be required to carry a five-man crew and an extra load of equipment that will include a new array of sensor and surveillance gear designed to sharpen the scout's eyes and ears. The scout's vehicle must provide efficient stowage and easy deployment of this equipment.

Finally, the next scout vehicle must be as similar as possible to the other basic combat vehicles of the future. This is true, first, because a unique scout vehicle on the battlefield in itself reveals too much intelligence to the enemy on the nature of the force he is encountering and, second, it is true because of logistical support limitations.

To meet these requirements, most armored cavalry units are equipped today with the *M-113A1*, mounting a .50 caliber machinegun. But this vehicle falls far short of meeting the previously identified requirements.

In mobility, we know both instinctively and analytically that the *M-113A1* cannot keep up with the *M-60A1* tank, and certainly will not be compatible with the *M-60A3* or *XM-1* tanks of the 1980's.

In terms of firepower, the *M-113* has no adequate midrange, high-rate suppression weapon and no armor-protected antitank capability. In a duel with typical threat vehicles, the current scout does not have a chance simply because of range limitations. Furthermore, the *M-113's* caliber .50 machinegun will penetrate only lightly-armored vehicles.

The protection levels provided by the current APC are no longer adequate to withstand the armor penetration abilities of our potential enemy. The *M-113* was designed to withstand only 7.62-mm machineguns and 105-mm artillery fragments.

The only two requirements currently being met by the *M-113A1* as a scout vehicle are load carrying capacity and commonality. The shortfalls in other areas force us to look for a replacement vehicle for the armored cavalry scout.

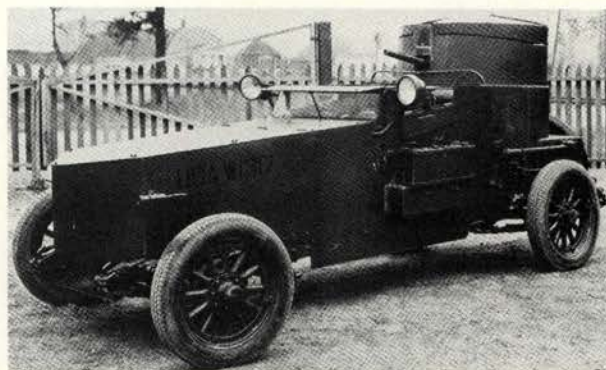
In order to eliminate the shortcomings we have just discussed, the formation of a conceptual platoon was proposed.

Conceptual Platoon

The Conceptual Armored Cavalry Platoon, with four tanks and five *MICV/Scout* vehicles, including the platoon leader's vehicle, has greater combat power and sustainability with no increase in manpower. Whenever the individual scout of the future is analyzed, he must be considered within the context of the platoon organization, since armored cavalry operates as a combined arms team.

Several factors have delayed deployment of this platoon until the mid-1980's. These factors include the *M-551* product improvement program and the availability of main battle tanks and *MICV/Scouts*.

The Armor Center has recommended two configurations of the *M-113A1* to serve as the basic scout vehicle for a transitional armored cavalry platoon until tanks and the *MICV* scout vehicle become available to fully implement the conceptual platoon.



Reconnaissance Car, Mechanized Forces — 1930.

The two configurations of the *M-113A1* are called the *Armored Cavalry Cannon Vehicle (ACCV)* and the *Armored Cavalry TOW Vehicle (ACTV)*.

The two *M-113A1* configurations proposed as scout vehicles are being designed and tested by the Armor Center. These vehicles are expected to fulfill the requirements for the armored cavalry from 1977 to 1983.

ACTV

The *ACTV* provides a unique means of utilizing the long-range antiarmor *TOW* missile. Using the standard *M-113A1* APC as a base, ground *TOW* system components and an *XM-65* dual pod *TOW*



The gunner of an *ACTV* can engage the enemy without being driven from his sight by enemy direct fire weapons.

launcher, currently used on the *AH-1Q Cobra* helicopter, were added. Along with these additions, an *M-27* cupola, originally a component of the *M-114A1E2* tracked reconnaissance vehicle, and flexible fiber optic bundle, enabling transfer of target image from the sight to the gunner's sight in the cupola, complete the *ACTV* recently built at Fort Knox.

Most recent testing of the system was conducted in late July and early August. Refined statistical tracking data was obtained from the tests in which 21 missiles were successfully fired resulting in 21 target hits against both moving and stationary targets. Further OT/DT type testing is planned for April-June 1976.

To illustrate the *ACTV's* advantage of bringing fire on the enemy while in complete vehicle defilade in a field environment, an *M-60A1* tank, a standard *M-113A1/TOW*, and *ACTV* were emplaced in adjacent firing positions to engage the same target; all three vehicles were emplaced by the same individual to insure identical sight pictures.

The *TOW* tubes could barely be seen, even when skylined, and by employing the trees as a background, the *ACTV* system completely disappeared.

The advantages to this approach are obvious. For the first time in the history of warfare, a gunner can engage the enemy with a direct fire weapon, but cannot himself be fired upon or be driven from his sight by an enemy's direct fire weapons.

If everything goes well, the armor-protected *TOW* package could be placed under contract and be in production by early 1977 for retrofit onto existing *M-113's* and for installation of additional *M-113's* beginning that same year.

ACCV

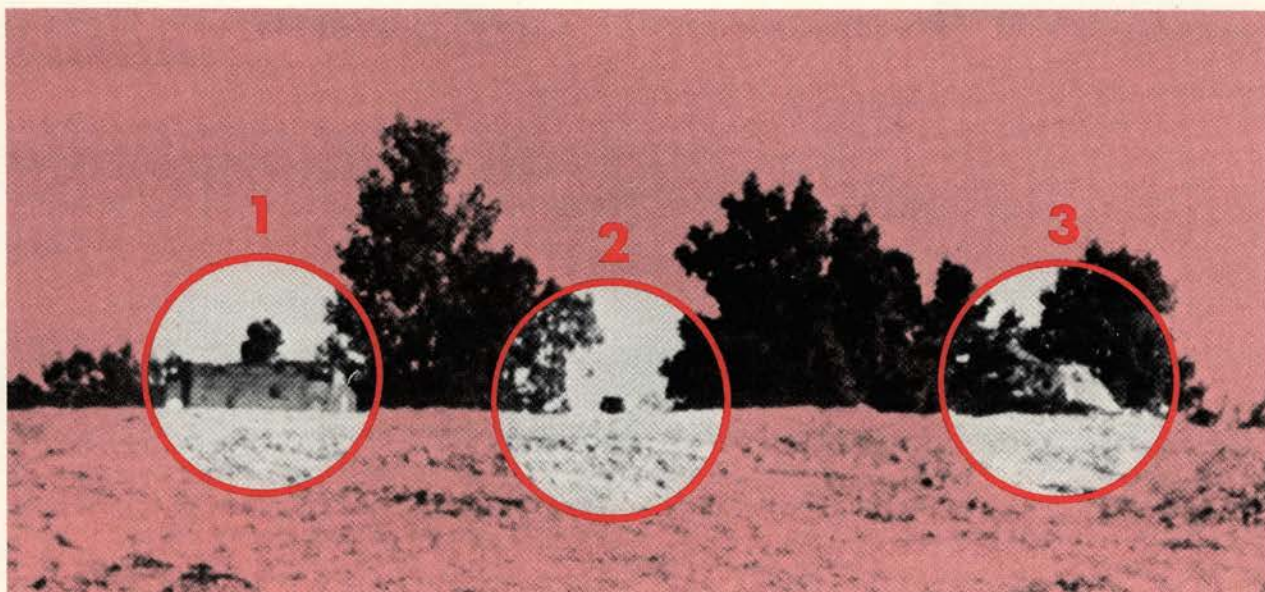
The *Armored Cavalry Cannon Vehicle* also begins with a basic *M-113A1* chassis. The *M-27* cupola is mounted on the vehicle with the *M-139* 20-mm cannon. Stowed equipment will include basic issue items for the *M-113A1*, plus scout-peculiar equipment. Due to the limited availability of the *M-139* 20-mm gun, the *ACCV* may be equipped with the Navy's *EX-29* 20-mm gun.

The program for development of *ACCV* is planned to parallel that for the *ACTV*. A Letter of Agreement (LOA) has been drafted at the Armor Center and preliminary coordination of the program has begun. Prototype testing and decision points for the *ACCV* will be the same as for the *ACTV*. The *Armored Cavalry Cannon Vehicle* is designed to be fielded beginning in 1977 when the first retrofit kits will be available.

A transition platoon has been devised as an interim organization until the conceptual platoon is implemented. The transition platoon will consist of three *ACCV's*, two *ACTV's*, and four *M-551 Sheridans*.

Implementing the transition platoon not only gives us an interim combat capability, but it also avoids the waste of the *M-27* weapons stations, valued at \$30,000 each.

This transition platoon will not meet all our requirements, but it will provide a quick fix to those shortfalls which can be readily addressed.



The TOW launcher of the ACTV(2), in a defiladed firing position alongside an M-113A1/TOW(1) and an M-60A1 tank(3), is practically invisible.

A Look into the Future

Looking further into the future, the armored cavalry vehicle of the 1980's will be a scout version of the *Mechanized Infantry Combat Vehicle*.

This *MICV/Scout* will have a turret which will integrate the *TOW* missile system and the *Bushmaster* 25-mm cannon. This vehicle will be configured for a five-man scout crew. All but five of the seats will be removed, and provision will be made for stowing equipment and sensor and surveillance devices used by scouts. The commander's station will be removed, and will be replaced by a turret holding one or two men. Finally, provision will be made for a passive driver's night viewer.

TRADOC and AMC have jointly drafted a Letter of Agreement (LOA) for the advanced development of the *MICV/Scout* with the *TOW/Bushmaster* integrated turret. Upon approval, the LOA will cover this development of the system through the advanced development phase. This phase of development will culminate in a Required Operational Capability (ROC) for the system.

Funds are being made available for construction of an Engineering Development (ED) chasis for the *MICV* configured as a scout. This is the eleventh *MICV ED* vehicle to be fabricated, and will be used not only for work with the integrated turret, but also for other testing of the *MICV/Scout* concept.

The *MICV/Scout* with an integrated turret can serve as either a cannon or a *TOW* dedicated vehicle. The key decision points for this program will be a DA in-process review (IPR) in April 1976, which

will determine which concept will be selected for prototype work. An Army Systems Action Review Council (ASARC) decision in May 1977 will determine if the *MICV/Scout* will proceed into the engineering development phase. If so, this vehicle will enter the Army inventory in 1983 for inclusion in the Conceptual Armored Cavalry Platoon.

Looking to the future, beyond the *MICV/Scout*, cavalry must continue to take advantage of the technical developments resulting from today's research and development efforts.

Future ground cavalry vehicles will utilize emerging hypermobile, agile ground-vehicle test-bed technology to facilitate high-speed, cross-country movement and increase survivability. Outcome of current research in lightweight, high-efficiency composite armor will reduce vulnerability to enemy fires.

Increased use of passive sensor devices — vehicular radar illumination detector and scanning optical augmentation locator — will add significantly to the scout's ability to find the enemy.

Hypervelocity, liquid-propellant guns and laser-beam-riding projectiles and missiles can increase the platoon's combat power significantly and extend the range of its weapons.

The use of these items currently in R&D and other developments yet to come will significantly increase the armored cavalry platoon's combat effectiveness by extending the range of both its surveillance equipment and weapons, while decreasing its vulnerability through increased mobility, agility, and improved armor.



1975 ANNUAL ARMOR CONFERENCE

XM-1 TANK SYSTEM

Major General Robert J. Baer

Project Manager, XM-1 Tank System

The *XM-1* is here today — the prototypes are running, the armament is firing, and the armor has displayed a level of survivability which exceeds the expectations of the most demanding tank.

The *XM-1* tank program has been in existence since September 1972 when my office was established. The mission I am charged with is to develop a tank which incorporates significant improvements in armor protection, mobility, firepower, reliability, availability, and maintainability with a ceiling on unit hardware cost of \$507,790 in FY 72 dollars. The program continues on schedule and within cost;

both contractors have done an exceptionally fine job, and from all indications, prior to government testing, the Army will have a great tank regardless of which one is selected for further development.

How does this combat vehicle provide so much at such a relatively low cost? ! ? Much of this credit can be attributed to the same Yankee ingenuity and perservance that contributed to the "Spirit of 76." Trade-offs were made and systems were reviewed to assure that increased performance was not attained at the expense of cost. Both were important in the mind of the developer and the designer. Although



Chrysler Version

the *XM-1* tank has been designed as a total system, different parts of the whole contribute to the specific capabilities of these fighting vehicles.

The increased firepower is derived from two areas of improvement. Each contractor has designed a totally new fire control system. Although they are technically different, both provide an accurate fire-on-the-move capability at both moving and stationary targets. This is due to the stabilized sight and stabilized weapon drive system. The system provides a full solution to all gunnery problems — the gunner merely lays the cross-hair on the target, moving or stationary, and the system does the rest. With the flick of his thumb, the gunner can range on the target instantaneously with the laser rangefinder and just as quickly pull the trigger launching an accurately aimed round. All of this is a tremendous firepower capability, but it doesn't stop there! The round fired is also greatly improved over current armor-defeating projectiles. Although the *XM-1* tank mounts the same *M-68*, 105-mm main gun that is found on *M-60/M60A1* tanks, a new *XM-735* armor-piercing, fin-stabilized, discarding-sabot (APFSDS) round gives the 105 a new punch. This round offers improved accuracy and penetration

capabilities that more than satisfy the *XM-1* material need requirements — but the developers haven't stopped there. The *XM-735* round is already demonstrating the capability for growth potential that will further enhance the firepower of the main battle tank of the 1980's. Additionally, this round has a tremendous fringe benefit; it can be fired from any *M-68*, 105-mm gun. So, the spin-off of the *XM-1* Tank Program provides a new capability to the *M-60*. Secondary firepower is provided by a caliber .50 machinegun at the commander's station (this will later be changed to a 40-mm high-velocity grenade launcher as a result of a Fort Knox Tank Special Study Group recommendation). The coaxial machinegun is a 7.62-mm machinegun and as a new addition in the *XM-1* tank, we have given the loader a pintle-mounted 7.62-mm machinegun. All of this adds up to a tremendous amount of firepower, which will make the *XM-1* the "dreadnaught" of any future land battle.

Mobility and agility have not been neglected. They equal and complement the firepower system. The high horsepower gives the *XM-1* greatly increased acceleration, and this, coupled with a very responsive transmission, gives the *XM-1* a level of



General Motors Version

agility not previously seen in a land combat vehicle of this size and weight. The real secret to the high-speed cross-country mobility is the high wheel travel which has been designed into both concepts of the *XM-1*. In some tests, the *XM-1* has traversed the cross-country course at speeds three times greater than the *M-60A1* tank over the same course. To accomplish this, the Chrysler version utilizes seven aluminum roadwheels, with advanced high-strength torsion bars and internal rotary dampers at positions one, two, and seven. The other positions have standard torsion bars. General Motors has taken a different approach; they utilize six large aluminum roadwheels, with hydropneumatic suspension on positions one, two and six. The other positions have high-strength torsion bars. The two prototypes have different type tracks; General Motors has a heavy-duty aluminum shoe track with replaceable pads similar to the *T-142*, while Chrysler uses a heavy-duty track with steel shoes and chevron grousers similar to the current *T-97*.

The *XM-1* also possesses a fantastic capability to reinforce — to move to the sound of the cannons — with its top speed of 45 miles per hour! A large part of this high-speed capability is due to the 1,500 horsepower engine. In the Chrysler version, the power is provided by an AVCO-Lycoming AGT-1500 regenerative turbine engine using diesel fuel. General Motors selected the Teledyne Continental Motors, AVCR-1360 diesel engine. The engine has 12 cylinders and is air cooled with variable compression ratio pistons.

Of interest, both General Motors and Chrysler selected the Allison X-1100 transmission to round out their power packages. This automatic, hydrokinetic (torque converter with automatic lockup) transmission has four speeds forward and two in reverse. It has integral brakes, infinitely variable steering and a pivot steer capability in neutral. With these power packages, both concepts have demonstrated the 45 miles per hour speed with ease, and the awe of a fast-moving, hard-hitting tank is most apparent.

The designers have also given the *XM-1* greatly increased ability to withstand the rigors of an enemy hit and continue to fight. It is a highly survivable tank due to its special armor, the compartmentalization of its fuel and ammunition, and agility previously discussed.

The compartmentalization reduces the secondary effects of a direct hit in the ammunition or fuel compartments to allow the tank and the crew to survive

to fight another day. In addition to the advanced armor and compartmentalization techniques, the vulnerability of the tank is further reduced because of its lower silhouette and its markedly improved agility discussed earlier.

TANK SYSTEM COMPARATIVE CHARACTERISTICS

	XM-1*	M-60A1
Weight combat loaded	49 to 58 tons	54.8 tons
Height (to turret roof)	90 to 95 in.	128 in.
Width	120 to 144 in.	143 in.
Acceleration 0-30 m.p.h.	6 to 9 sec.	12.2 sec.
Cross-country speed	25 to 30 m.p.h.	10-12 m.p.h.
Top speed	40 to 50 m.p.h.	30 m.p.h.
Speed on slope 10%/60%	20-25/3-5 m.p.h.	10.5/1.5 m.p.h.
Main weapon	105-mm	105-mm
Coaxial weapon	7.62-mm mg	7.62-mm mg
Commander's weapon	40-mm hvgl/mg	.50 cal. mg
Loader's weapon	7.62-mm mg	None

*Material-need document requirements.

Although it is obvious that the *XM-1* possesses a tremendous amount of fightability, ease of maintenance has also been included in the system design. These maintenance design considerations have resulted in a predicted ratio of 1 hour or less of maintenance for each hour of vehicle operation.

The contractors are currently conducting system tests on their prototypes and the results thus far have been excellent. Both contractors predict that their prototypes will achieve or surpass the government's performance requirements. This will be proved during Development Testing and Operational Testing (DT/OT I) to be conducted by the Army during the February-May 1976 time frame. There is no reason to expect that either prototype will come up short during these tests. Component test results and contractor system test results all point toward success in DT/OT I. Tankers who have been fortunate enough to observe demonstrations and test ride the prototypes all support this view. No one who has ridden in either prototype has failed to be impressed by the obvious advances in the shoot-on-the-move capability, mobility, and agility. Additional good news is that both contractors predict that their tank can be produced within the \$507,790 (FY 72 dollars) unit hardware cost ceiling. These are not just "pie in the sky" predictions. They are supported by government design to cost reviews that include a thorough examination of each contractor's production cost estimating procedures. The *XM-1* will provide the United States with the best tank in the world in the 1980's—the *General Abrams*.

ARENBD BRIEFING

By Major Nile S. Lockwood

Service Test Project Officer, ARENBD



Gentlemen, I am Major Lockwood from the Armor Test Division of the Armor and Engineer Board. We are located here at the Armor Center and are dedicated to increasing the flexibility and effectiveness of our combat soldier. We accomplish this by insuring that the equipment he uses not only works and is needed, but that it complements the organization for which it was designed.

The Armor and Engineer Board was transferred from TECOM and AMC to TRADOC effective 1 July of this year. This move provides the user with the means to conduct the testing and experimentation needed:

- to evaluate concepts in material and tactics,
- to contribute to the development of new requirements, and
- to conduct operational testing—for which TRADOC is responsible as part of the materiel acquisition process.

Our primary functions are to conduct operational tests of non-major systems and conduct Force Development Testing and Evaluations. We also provide testing support on a customer basis to AMC/TECOM, OTEA, and others.

The *T-62* is the primary Soviet medium tank. We therefore consider this the primary threat to our armor and armored cavalry forces. We estimate that the Soviet bloc countries have more than 10,000 of these tanks in their inventory.

Since we consider the *T-62* to be on a par with the *M-60A1* with add-on stabilization, survivability becomes a key issue. Some armor leaders favor increased armor protection, while others favor mobility, speed, and agility. The truth probably lies in a combination of all these. In order to help clarify this point, we have embarked on the STAGS test.

The word STAGS is an acronym, the first two letters standing for *S-Tank*, the next two for agility, and the last for survivability.

Since 1973, the Defense Advanced Research Project Agency has been involved in an effort to advance the American state of the art in combat vehicle technology. A major part of this effort involves an assessment of foreign tank technology. To assist in this effort, General Starry accepted the responsibility for conducting a 6-month evaluation of the *S-Tank*. He then designated the Armor and Engineer Board as his agency to plan, execute, and report on the test.

I want to stress that we are in no way contemplating or advocating adoption of the Swedish *S-Tank*. Instead, we are interested only in certain features of the tank which may give us insight into componentry for future combat vehicles. Foremost of these features are: three-man crew operations and the survivability aspects afforded by the lower silhouette, and increased mobility and agility.

In order to study certain features of the *S-Tank*, it is necessary for us to compare the performance of the entire system to that of the American Army's main battle tank. This identifies the second test objective—that of comparing the overall system performance of the *S-Tank* to the *M-60A1* with add-on stabilization.

The third and final objective of our test is a major effort to isolate and quantify the several variables which contribute to combat vehicle survivability on the battlefield. At this point, we hypothesize that these variables fall into three categories. First of these is vehicle characteristics—silhouette, speed, acceleration, and turning agility of the hardware. The second category includes movement techniques used by the crew—high constant speed, rapid starts and stops, and various evasive actions. Finally, the third category involves battlefield conditions, such as the effects of various intervisibility segment lengths, and the use of terrain. These experiments and the quantified data which we are gathering are the

means by which we intend to evaluate the effects of mobility, agility, and silhouette on tank survivability.

We anticipate completion of the *S-Tank* testing in December of this year.

E3 Evaluation

A program to incorporate a series of improvements into the *M-60A1* tank was approved in 1970. This product improvement program was begun in order to correct certain firepower, mobility, and reliability deficiencies of the current *M-60A1*, and to insure a modern competitive tank for the immediate future, prior to the incorporation of *XM-1* into the tank fleet.

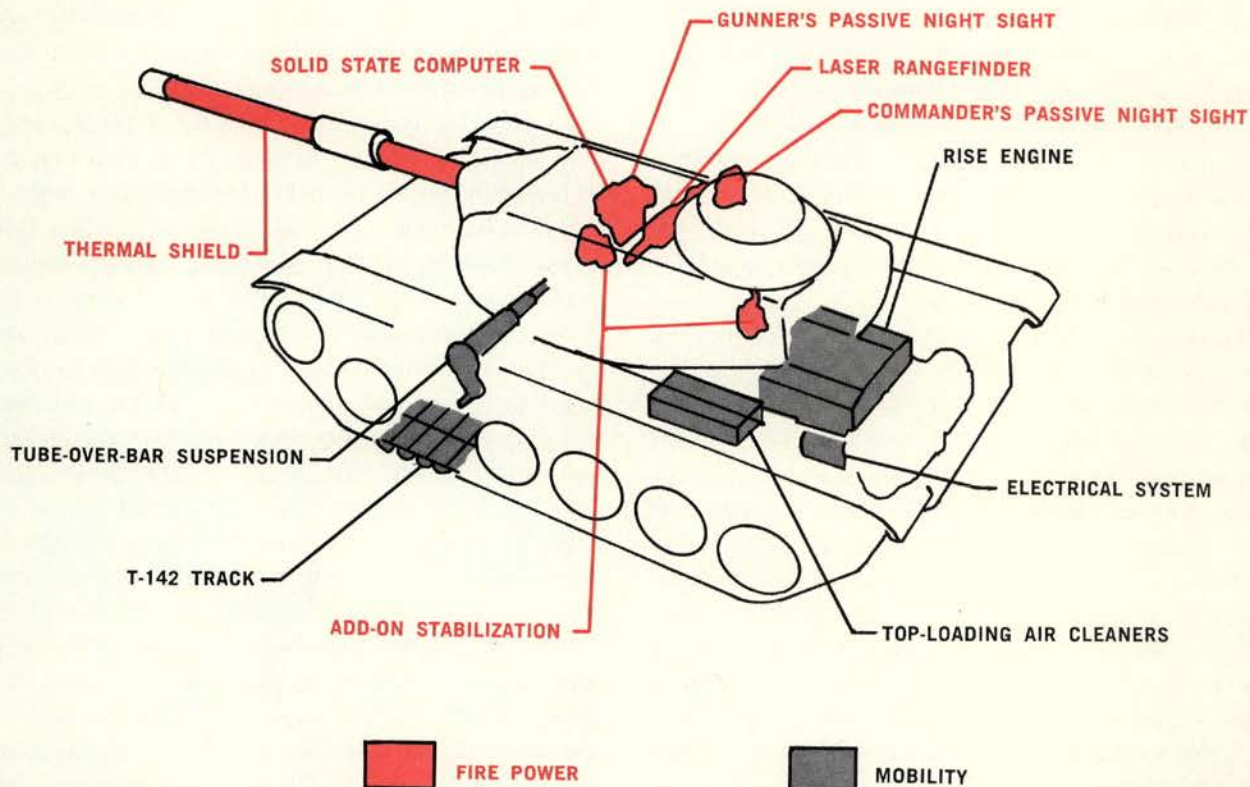
Testing of the *M-60A1E3* at the board began with Developmental Test (DT) II in 1973. DT II was followed by Operational Test (OT) II, which the Armor School conducted in the fall of 1974. In all, we have had the opportunity to test 10 of these tanks for varying periods of time. Our accumulation of more than 30,000 miles and the firing of more than 7,000 rounds in our test have thoroughly convinced us of the capabilities afforded by this vehicle.

Our most recent and on-going efforts have been

in the selection and training of crews for the *E3*. We are being assisted in this three-phase effort by the Armor School, Army Research Institute, and by TRADOC's Training Systems Analysis Activity. The first phase of this program began about 12 weeks ago, when instructors from the Armor School were trained in gunnery techniques peculiar to the *M-60A1E3*. They, in turn, conducted an 8-week training program for crew members from the Lightening Brigade during Phase II. This involved classroom and laboratory instruction as well as the tank tables through Table VII. Phase III consisted of a modified Table VIII, which included 14 main gun engagements. These engagements included moving tank, moving target, and canted firing positions. Prior to the start of Phase I, and after completion of each following phase, tank crews were given special skills tests. All this information is now being analyzed in detail. And from it, we hope to gain valuable insights into crew requirements for the future.

Recent congressional actions have temporarily suspended funds earmarked for purchase of the laser rangefinder and the *XM-21* solid state computer. The high dollar cost was the main reason behind this

PRODUCT IMPROVEMENTS



decision. We are still evaluating the contributions made by these two major items in light of increased performance compared to increased cost. Reprogramming actions may be taken by the Army staff pending the outcome of the E3 in-process review scheduled for this November.

Coax Upgrading

Increased performance is also the goal for my next topic, the coax. For years now, tankers have expressed a desire for a coaxial machinegun which would function reliably when called upon. Therefore, we have exerted a major effort to improve the operational readiness of our tank fleet by upgrading our secondary armament.

The *M-219* is the coaxial machinegun on our current tank fleet. It was originally developed as the *T-197* during the period 1951-59, against a requirement for a tank-mounted machinegun that could use the standard 7.62-mm NATO cartridge. It was classified Standard A as the *M-73* in May 1959 and has since evolved into the *M-219* through a program of field fixes.

Continued complaints from the armor community, coupled with unfavorable reports from the Israeli Defense Forces concerning *M-219* reliability resulted in a DA directed program designed to select an acceptable weapon from existing "off-the-shelf" hardware. This combined user/developer effort included both foreign and domestic weapons.

Foreign contenders included the British *L-8A1*, Canadian *C-1*, the French *AAT-52*, and the German *MG-3*.

Best of the foreign contenders was the Belgian *MAG-58*. All foreign weapons testing was conducted by Rodman Laboratory at Rock Island Arsenal. This firing was all conducted from bench mounts in the laboratory environment.

The Fort Knox test included the production *M-219* machinegun which was to provide the baseline data against which all contenders, including the *Product Improved M-219*, were to be compared.

During our test, which lasted from 1 November 1974 to 22 April 1975, we fired nearly a half-million rounds through the *M-219*, *Product Improved M-219* and *M-60E2* machineguns. Fort Knox firing was in the operational vein and was conducted in its entirety from moving and stationary tanks.

The results of our test upheld the complaints that the *M-219* lacked the reliability and durability required for a machinegun. Both the production and

Product Improved M-219's developed cracked receivers with an average of less than 19,000 rounds per gun. Mean rounds between stoppage (MRBS) for the production guns was 215 rounds while MRBS for the product improved guns was only 139.

What was encouraging about our test was that we found an item (the *M-60E2*) which was many times more reliable and far more durable than our present coax. All *M-60E2* systems were serviceable at 75,000 rounds each. It gives us the added benefit of being greater than 80 percent parts common with the infantry standard weapon, while costing approximately one-third that of an *M-219*.

Armed with this data, we briefed DA on 29 March and again on 6 May. The guidance was to stop production of the *M-219*, and to proceed with an in-process review (IPR) for the *M-60E2*. The IPR was conducted in June and the recommendation for a low rate initial production (LRIP) buy of 416 *M-60E2* machineguns was approved by DA. That was enough to equip the entire Marine Corps tank fleet.

At the time we were conducting the IPR for the armor machinegun, President Ford and Secretary Schlesinger were in Belgium discussing the Belgian purchase of the *YF-16* fighter aircraft. As a result of those negotiations and the fine performance of the *MAG-58* during foreign weapons testing, we were directed to conduct a shoot-off between the two weapons.

Both are fine weapons and are expected to perform in an outstanding manner. This comparative test will be conducted at Fort Carson during the period 15 October to 19 December. The Secretary of the Army will then present his recommendation to the Secretary of Defense for a decision on 28 January.

We expect a cost and operational effectiveness analysis (COEA), being conducted here at Fort Knox, to be the driving force behind this decision. Regardless of which way the decision goes, we can expect a far better coax in our immediate future.

Smoke System

For some time now, our ability to use smoke effectively has been hampered by the lack of a system which could produce smoke quickly and in an amount which was effective. This spring, we had the opportunity to run an experiment with a rear projection smoke system which we feel has real po-

tential. It blows raw fuel directly into the exhaust much the same as the Soviet system on the *T-62*.

To use the system, the driver revs the engine to approximately 1,500 RPM's and cuts on the switch which opens the fuel jets into the exhaust. (This particular system optimized at a fuel consumption rate of approximately one-half gallon per minute.) The smoke has an unpleasant odor, but does not irritate the eyes or skin as the engine exhaust does.

One of the selling points of this system in addition to cost and availability is that it is safe. The crew does not have to button up to use it, and it is safe to use with exposed infantry in the area.

Funds have recently been allocated for the purchase of several launchers of the type the United Kingdom uses on their tanks. We will be conducting a detailed test of the UK system, as well as several other systems during the second and third quarters of this fiscal year. Based on the results of our testing, we hope to field an effective smoke system or combination of systems in the very near future.

M-48-Series Conversion

A deficiency in our armored forces which must be rectified is the shortage of dieselized 105-mm gun assets. The *M-48A5* tank is our interim solution to this problem. This tank is basically a dieselized and upgunned version of the *M-48*-series 90-mm tank gun used prior to introduction of the *M-60* series.

Utilization of the obsolete *M-48*-series gasoline-burning tanks is not a new venture. Many of these vehicles (the *M-48A3*'s) were dieselized and used extensively in Vietnam.

Significant improvements in the *M-48A3* over the *M-48A1* included the diesel engine, dry-type air cleaners, hydraulic turret controls, and the coincidence rangefinder standard in the *M-60A1* tank.

The proposed *M-48A5* differs from the *M-48A3* in that it will mount the 105-mm gun, and be equipped with a reliability improved engine and air cleaner system.

The major external differences between the *M-48A5* and the *M-60A1* tanks are the shapes of the turret and hull castings. The *M-60A1* turret has a larger volume due to an extended bustle which provides additional space for ammunition stowage. Additionally, the *M-60A1* has a chisel shaped front slope compared to the elliptical front slope of the *M-48A5*. From the standpoint of physical and performance characteristics, there is not a great dif-

ference between the two tanks. The *M-60A1* is about one and a half tons heavier, has a slight advantage in cruising range and also in night fighting capability.

The Armor Center has concurred in the *M-48*-series tank retrofit plan, but has required that certain improvements be included. These recommended items include an Israeli Defense Force-type cupola with 7.62-mm *M-60D* machinegun. We also insisted that main gun ammunition stowage be increased to 54 rounds and that two pintle mounts be emplaced at the loader's station to accept the *M-60D* machinegun. This tank in its final configuration will mount three 7.62-mm machineguns, one as the coax, one at the tank commander's station, and the third at the loader's station.

Hopefully, these improvements will be ready for application in the second phase of production and will be retrofitted to tanks already produced.

Conversion of the *M-48*-series vehicles to 105-mm gun tanks was considered and rejected in early 1973; however, events since that time have led us to reevaluate our position. Unprecedented losses of tanks from the Army inventory and production line to meet foreign demands and increases in the authorized acquisition objective have been the prime motivators.

Since the *M-60*-series production rate cannot be accelerated to overcome the current and projected five-year shortage of main battle tanks, we consider the conversion of *M-48*'s as the most expedient means of upgrading the tank fleet in the shortest possible timeframe. Conversion of 360 *M-48A3*'s to the *M-48A5* configuration has been funded and will be accomplished at Anniston Army Depot. In a subsequent phase, about 850 unserviceable *M-48A1* vehicles will be converted to the *M-48A5* configuration. Production of the 1,200 converted tanks will be completed by late 1978.

The first tanks from this program have been evaluated at Yuma Proving Grounds, while the Armor and Engineer Board are to receive the first *M-48A5*'s for evaluation in November.

The time since the last Armor Conference, although an extremely busy period, has been particularly fruitful for the Armor and Engineer Board. As we look to the time between now and the next conference, we see projects such as *XM-1*, *MICV*, *M-48A5*, tank thermal sights, passive sights, a definition of land vehicle capabilities, and a revision of battlefield gunnery techniques, as well as several other major efforts.

THE THREAT

By Major David W. Daignault

Threat Manager, Fort Knox (DCD)



Before discussing new tactics, one must first understand the reasons that necessitated the change. The primary reason is that in the next war we will fight the first battle outnumbered. Another reason is to counter the doctrine and tactics of threat forces. A threat force is any force or army in the world which has received Soviet arms and equipment. This presentation will provide an overview of threat force doctrine, tactics, and organization.

Threat Principles of War

Threat forces base their tactics, doctrine, and organization on three principles of war.

The first is the principle of *objective* — they achieve this by willingness to accept high losses. When discussing threat, do not think of U.S. tactics or doctrine, completely disregard normal U.S. thinking. High losses in threat forces are 60 to 70 percent. They are willing to accept such losses and still continue to fight and maintain an offensive posture. In addition, they attempt to bypass all resistance, so as not to slow their momentum. They are always trying to obtain their objective and they attempt to move 35 to 50 kilometers in a 24-hour period. This is their objective in conventional warfare.

How do they achieve their objective? They do it by employing the second principle — *always be on the offensive* — using speed, continuing to move, to put pressure on their opponents, trying to gain that 35 to 50 kilometers each and every day. In order to do that, they need mobility. In every threat force, every person rides on either a tracked or wheeled vehicle. The only time they don't ride is when the infantry is forced to make a dismounted assault.

They believe in penetration — making several penetrations along the front, causing envelopments, trying to disrupt what is going on — pouring forces through to make immediate exploitations of the penetrations. Threat forces practice, preach, and believe in nuclear, biological, and chemical warfare. They fully expect to operate in this type of an environment and they train in this type of environment, in some cases, wearing their gas masks for a 24-hour period. They have an overlap of all their weapons systems — for instance, air defense. Their air-defense umbrella is not one single weapon — it is several weapons of varying ranges depending upon the level of command. Antitank systems are the same, each complements the next out to the maximum range. Threat forces are trained for and expect to be in operation 24 hours a day. All of their vehicles are equipped with night vision devices, either night driving aids, or in the case of the weapons, night vision equipment for target acquisition and fire control. For threat forces, there is no difference between daylight and night operations, other than they hope to have an advantage at night.

Just how do they expect to take all these attributes and make all of them work? Easy, all these attributes are part of the tactics described by one word, *mass* — the threat's third principle of war. Threat forces believe in mass. They feel that if they outnumber their opponents and use their masses of equipment and men, maintain continuous pressure and keep moving, they are going to win. This is not a bad tactic if you have the mass. It goes along with one of the points mentioned previously, their willingness to accept high losses. If the threat has masses of equipment and men, he will, and can, take losses which appear to us to be excessive. Ad-

ditionally, the threat is a strong believer in artillery and he has plenty of it. In the breakthrough attack, which will be described later, threat forces will fire as many as 80 to 100 tubes of artillery into one square kilometer of the area they intend to strike after massing for a breakthrough. The artillery will fire for 20 to 40 minutes. The threat is also a strong supporter of the combined-arms concept, using the combined arms — infantry, armor, and artillery — in massed formation with their weapons overlapping each other.

Threat forces use echelonment. They have one level of forces forward and another to the rear, at all levels, giving them depth in both the offense and defense.

Offense and Defense

As for the offense, the threat favors the breakthrough attack. Threat breakthrough attacks are designed for one purpose, to get a superior force ratio in one particular area of the battlefield where they can break through and move into the enemy's rear area. The force ratio they are looking for, and they obtain it by mass, is in excess of 6 to 1 in an area from 2 to 4 kilometers wide. This is not intended to give the impression that threat forces never expect to go on the defense — they do, but they only expect to do so during lulls in offensive operations.

Even in the defense, which is a secondary role for them, they still maintain all the attributes previously mentioned. They mass their forces. The battalions on line are backed up in depth by another battalion, so they have one defensive belt forward and another to the rear. There is a small reserve unit behind the two belts, usually a tank company. This tank company is used to counterattack any penetration into either one of the defensive belts. Behind the first two defensive belts there is a third belt consisting of another battalion and behind that, yet another one. They build up these types of interlocking positions, covered by some type of an armored unit which is ready to counterattack any penetration.

Threat Divisions

There are two types of threat divisions — motorized rifle and tank. These divisions are organized in a triad-type organization. In the motorized division, there are three motorized rifle regiments. In addition to the infantry units, there is a reconnais-

sance battalion and a tank regiment at division level, providing a combined arms capability. Moving down one level to the regiment, there is a reconnaissance company, three infantry battalions, and a tank battalion, which can be cross-attached to form combined arms teams. Then, a look at the battalion reveals three motorized rifle companies and one company of armor, in each of which there are three platoons. These platoons are mounted in armored personnel carriers, the newest one of which is the *BMP*.

The *BMP* is a completely self-contained fighting vehicle. It carries a squad of eight, seated four on each side, back to back, facing outward at each of four firing ports along the sides of the troop compartment. Squad members connect their rifles to a small tube which evacuates gases from inside the vehicle, enabling them to fire from inside while it is on the move. The main armament of the vehicle is the 73-mm gun above which is mounted an antitank *AT-3 Sagger* missile.

The tank company is armed with the *T-62* tank — a tank that should not be underestimated. It may not be exactly comparable to our *M-60*-series, but it is a good tank and the threat forces know how to employ it. Its 115-mm smoothbore main gun fires one of the fastest rounds in the world — a sabot round that has a muzzle velocity of 5,200 feet per second.

Mass vs. Gunnery

However, there is a difference in gunnery techniques. We look for individual tank accuracy, they mass their fires, by having as many tanks as possible engage a single enemy tank. Therefore, what they lack in fire control sophistication they make up for in numbers. The tank division is also organized in the triad, with three tank regiments, one motorized rifle regiment, and a reconnaissance battalion. Then, within the regiment, there are three tank battalions and one motorized rifle battalion. As to numbers of combat vehicles per division, the figures vary; within a tank division there are 325 tanks and 93 *BMP*'s, and in the motorized rifle division, there are 215 tanks and 279 *BMP*'s. These numbers are unclassified. In summary, threat forces are not invincible. They have exploitable weaknesses and they also have strongpoints, which in some cases, can be used against them. That is the reason for the revised tactics we must use to defeat the threat forces, should the need arise.

HOW TO DEFEND OUTNUMBERED AND WIN

By Lieutenant Colonel David L. Tamminen
Member, How to Fight Team, USAARMS



In any future conflict, the U.S. Army will find itself fighting outnumbered. In order to offset the enemy's numerical superiority in the initial battles of the next war and to incorporate the latest advances in technology, new defensive doctrine has been developed. The purpose of this briefing is to orient you on how we see the conduct of the new defense.

Both as a quick refresher and as a comparison, figure 1 portrays a heavy division deployed under current defensive concepts. Close to the enemy is a covering force normally controlled by corps. It picks up the enemy, delays him for a time, does some fighting, and then passes to the rear. It conducts a passage of lines and hands-off the enemy to the next layer, which is the general outpost, controlled by division. This force also does some fighting and delays the enemy to some extent. It, in turn, passes back through and hands-off the enemy to a third layer, the combat outpost. They do little fighting, but must also hand-off the enemy and make a passage of lines. The covering force usually goes all the way out of the division area. The general outpost often goes to the division rear and the combat outpost to the task force rear. In the area defense, the mission of the division is to stop the enemy forward of or at the FEBA. To do this, the bulk of the division's combat power is allocated to the forward defense area. In the mobile defense, emphasis is still on retention of terrain; however, the division allows a controlled penetration to develop, with the intention of ultimately restoring the FEBA by counterattacking with four or five maneuver battalions to destroy the enemy caught inside the penetration. We are certain that neither of these styles of defense will allow us to defeat the hordes of enemy we expect to encounter in the next war.

Since enemy forces will be numerically superior to the friendly forces in the initial battles, our de-

fense is being modified significantly. The emerging concepts for defense focus on the enemy rather than on terrain. Defense will be conducted in depth, using all means available to destroy the enemy within the defensive sector, contain him, or force him to withdraw.

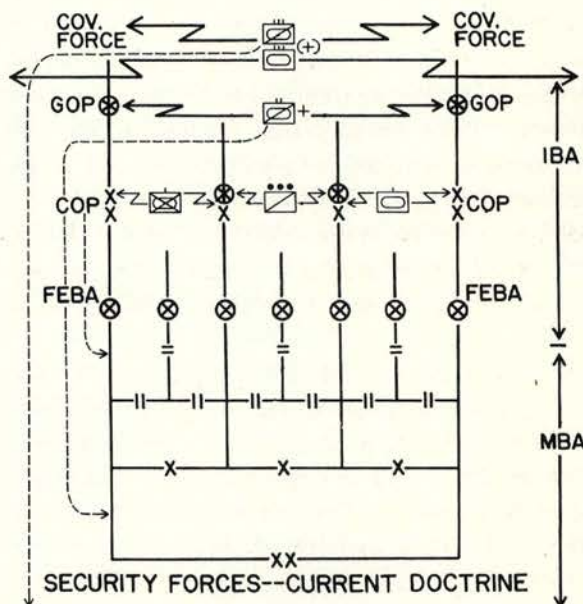


Figure 1.

The following four tenets should guide leaders and soldiers as they go about setting up the defense.

First: *The defender must understand the threat* in terms of the large masses of enemy to be encountered, the technical capabilities of his equipment, and his tactics of mass and breakthrough. In brief, we know that the enemy's weapons are good — about equal to ours — and that he moves to contact with multiple motorized rifle or tank battalions, normally deployed in a march column 800 to 1,000 meters in length. A forward reconnaissance screen precedes the lead battalions. They have the mission of locating our positions and any weak points that

may exist. If the reconnaissance elements locate our positions, we will be suppressed with artillery, while he attempts to bypass and to penetrate into our rear area. If he cannot bypass our positions, the enemy will conduct a hasty attack, deploying directly from his march column. If this attack is unsuccessful, the enemy takes up a hasty defense (as close to the defenders as possible), while the following battalions conduct a deliberate attack. If none of these work, he will mass as much offensive power as two divisions on 6 to 8 kilometers and make a "breakthrough" attack. Enemy forces will accept heavy casualties to accomplish their mission.

Second: *The defender must know the terrain* and use it to best advantage. As a defender, he can do this better than the attacker because he controls the ground over which the battle will be fought. He can choose the specific ground on which he wants to fight, prepare positions, emplace obstacles, reconnoiter routes, prestock supplies, and examine the battlefield in advance from both his own and the enemy's point of view. He can operate from behind carefully selected cover and from positions in defilade. While the attacker must often use his firepower on the move or in hastily selected positions, the defender can emplace his weapons on reverse slopes so he can fire at optimum ranges without exposing himself to frontal fires of the enemy.

Third: *Defend in depth.* Since the defender has to fight and win while outnumbered, he cannot afford to occupy fixed positions along the FEBA and slug it out. Instead, he must fight the defense in depth, taking advantage of every aspect of the terrain and of his equipment to whittle away at the enemy as he presses the fight. In essence, the defensive scheme requires setting up a series of positions, in depth,

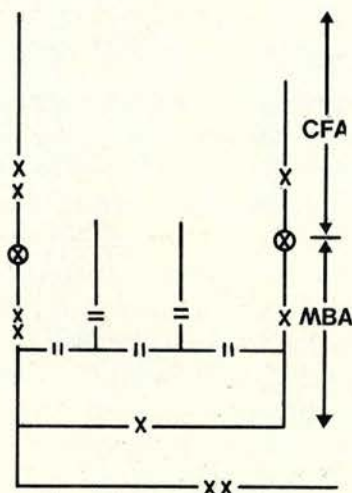
from which the defensive battle will be fought. Each set of positions should approximate a mini-ambush. By engaging in ambush-like actions, then moving, the defender can take out two or three enemy vehicles with each weapon of his own, while losing none in the process.

Fourth: *Counterattack when probability of success is high* to finish destruction of the enemy. Since in the counterattack the defender gives up many advantages, the decision to counterattack must be considered very carefully. Counterattacks by battalions or larger forces will be rare. Most counterattacks will be by fire only and all must be completed in time for the defender to return to covered positions before the following enemy echelon arrives.

Decision points will be many. There will be decisions on when to engage; decisions as to movement of units; and decisions as to activation or delivery of fire support or obstacles. Platoon leaders and team commanders will personally control the fight. The decisive battles will be won at low level (platoon, team, and task force), with small reserves, if any, retained by brigade or higher. Rather than a few major actions involving large formations, there will be numerous small unit actions that will wear down the enemy and have a cumulative decisive effect.

Setting Up the Defense

We see the defensive battlefield of the future laid out as shown in figure 2. The battlefield will normally be organized into two areas: covering force area (CFA) and main battle area (MBA). Covering forces will be antitank-heavy, and will fight a major battle to make the enemy form his breakthrough attack. Knowing the location of the massed



COVERING FORCE AREA (CFA)

- Antitank hvy (tanks, Sheridans, TOWS, AH)
- Inflicts maximum destruction without sacrificing tactical integrity of force in order to strip away enemy's recon elements, force enemy to deploy, bring up artillery attack and thereby reveal his composition, strength, capabilities, and intentions

MAIN BATTLE AREA (MBA)

- Forward committed battalions
 - Initially mech inf-hvy
 - More tank units are available after IBA battles
- Fights decisive battle in order to destroy, contain, or force the withdrawal of the enemy from the assigned sector
- Reserves (Bde/Div)
 - Add depth
 - Blocks, reinforces, or counterattacks

Figure 2. Layout of Battle Area

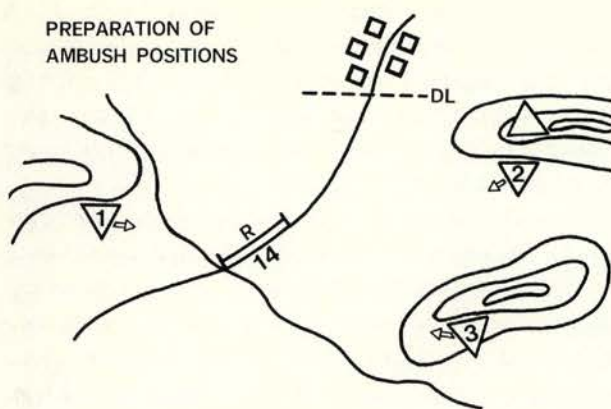


Figure 3.

enemy and the direction of his breakthrough attempt, commanders in the main battle area can move to defeat him. Note several changes already embodied in the CFA. We have a single force which is strong and capable of inflicting great damage. We do not have a triple layer, none of which is capable of doing much by itself. We have but *one* passage of lines, not three, and *one* handoff of the enemy, not three. In addition, these extremely capable tank killing forces are retained in the main battle area and are not sent to the corps rear.

In the main battle area, we visualize much wider and deeper sectors than in the past. A tank-heavy task force may defend a sector which is 8 or 9 kilometers wide by 15 or 18 kilometers deep. An MBA task force commander is successful if he prevents the enemy from passing his rear boundary. He can destroy, contain, or drive the enemy back. Very often the division will place all three brigades forward and will retain a relatively small reserve positioned in depth, along the most likely enemy avenues of approach. The reserves will be committed to the fight by attachment to forward brigades.

Using the four tenets discussed previously, let's examine how a team commander goes about setting up his defense. Figure 3 represents a piece of ground in which there are several hilltops, a small village near the top, and a road running diagonally to the left across a small stream. A team commander having this terrain as part of his defensive area would, during the preparatory stage, reconnoiter battle positions behind all these hills (graphically battle positions are portrayed as numbered triangles). These positions are general locations assigned by battalion, or identified by the team commander as a result of his reconnaissance (each arrow indicates a primary direction of fire). As a rule of thumb, positions are always planned, prepared, and

reconnoitered at least three deep. In reconnoitering a battle position, the team commander considers its suitability in terms of field of fire, cover, concealment, and routes of withdrawal. If found inadequate, he either plans to improve them or he selects a new position, notifying task force of the change.

While reconnoitering battle positions, the team commander also verifies areas where the fires from one or more terrain-masked battle positions can be placed on an exposed enemy. He then prepares an integrated defense plan for each set of positions, showing likely engagement areas, sectors of fire and things not shown on the illustration, such as indirect fire targets, obstacles, location of security elements, and surveillance sectors. He plans indirect fires forward of the team's initial positions, within likely engagement areas and along routes of withdrawal. He also plans fires to cover dead space and obstacles. Observation posts (OP's) are sited for observation along avenues of approach. Ground surveillance radar is positioned to provide surveillance along avenues the enemy will use at night or in rain, or other periods of reduced visibility.

Conducting the Defense

Having prepared the defense in depth, the following example illustrates how a typical defensive action is conducted at company/team level. In this situation, (figure 4), a balanced team operating as part of a mech-heavy task force is deployed astride an enemy battalion-size avenue of approach. Tank platoons occupy battle positions 5 and 6. Mechanized infantry platoons occupy battle positions 2 and 4. The team command group (consisting of the team commander, artillery FO, and mortar FO) is located in the vicinity of battle position 6.

At 0715, team OP's sight an enemy tank battalion supported by a company of motorized infantry mov-

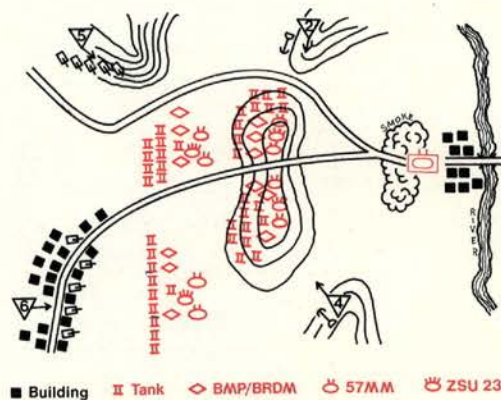


Figure 4.

ing toward the river. As enemy forces near the river, enemy artillery begins to fall within the team battle area.

Analyzing the situation and using his knowledge of enemy tactics, the team commander decides not to reveal the ambush positions of his forces, but to initially engage the enemy with artillery. He directs the platoon leader located at battle position 2 to adjust artillery on the crossing site, and hold ambush fires until the lead elements have crossed the river and attempt to widen the bridgehead.

Following the initial artillery engagement, the platoon leader at battle position 2 reports some enemy vehicles damaged and more than 30 crossing the river.

At 0725, the OP reports light artillery is continuing to fall in his area, that the enemy battalion has crossed the river, and is approaching the team's area. Another reinforced enemy battalion has just arrived at the river and is starting to cross. The team commander instructs the OP to remain in position. The commander quickly considers his situation. Are his forces ready to engage this enemy unit? Can he afford to ambush two battalions? Is artillery available? What is happening on the left and right? Among the many mental decision lines (DL), the team commander decides that when the leading enemy vehicles reach the road junction about 800 meters from the town, he can make no more adjustments. He must either fight or get out. He has already planned a trigger point where action will be initiated. This point, one of several trigger points, is known to all platoon leaders. If, for any reason, a platoon is out of communication with its headquarters, it is free to engage any enemy force crossing a trigger point.

When the first enemy vehicles approach the trigger point, the team commander calls for fire to blind the following battalion, thus isolating the lead battalion momentarily, then he calls for preplanned fire in the target area. Knowing the time of flight of the artillery, he waits a few seconds so that when he engages by direct fire, he will only do so for the few seconds before artillery fire impacts. Having imposed "hold fire" on all platoons, they know by SOP that they fire, in this case, only on signal. He then has two missiles fired from battle positions 2 and 4. Upon impact of the *TOW*'s, the tank platoons immediately terminate the engagement and, using covered and concealed routes, move to new battle positions. The team commander evaluates the damage on the enemy and reports to the task

force commander. Depending on the situation, the team commander might have decided to reengage in the same general area, to counterattack, or, to move to different battle positions and do it again. The mortars, having initially suppressed enemy overwatch positions, shift to augment the artillery fire covering the team's relocation to other battle positions. This fire in the target area both continues destruction started by tanks and *TOW*'s, and degrades the enemy's ability to return fire on them. Since the ambush is executed quickly and the platoons move into covered positions after their third volley, the enemy force is unable to return fire on the team. The enemy force lost 16 tanks and three or four *BMP*'s in this ambush. Excluding artillery time of flight, the ambush lasted 15 seconds.

Intensity of Future Battles

No change explained here is revolutionary. All are evolutionary. No change requires any difference in training at soldier level. This defense system is built upon the same bedrock that has sustained mounted operations for 60 years: understanding the mission (which is to destroy the enemy), appreciation for what terrain can do for us, sure knowledge of the enemy, careful planning, and violent execution. It depends on good gunnery, integration of all resources in the *see-move-suppress* dynamics of the battlefield and, above all, the *employment of combined arms*.

It is only the degree of intensity that has changed. The intensity and rapidity of the first battles of the next war will be as different from World War II as was *blitzkrieg* different from the French fighting of World War I. Greater responsibility rests upon the shoulders of small unit leaders than ever before. Generals will bring forces to the battlefield, colonels will supervise large pieces of that battlefield, but captains, lieutenants, and noncommissioned officers will fight the battle. We have good soldiers. The final outcome depends upon the imagination, spirit, and professionalism of the leaders. To portray the degree of intensity we do expect, and therefore the degree of responsibility we must expect from small unit leaders, here are some results from one of a series of detailed studies.

The study, called *Hunfeld II*, examined the actions of a portion of the covering force in Europe. In the scenario, a covering force slice of two regimental cavalry squadrons, one tank-heavy task force and one attack helicopter platoon, supported by 14 artil-

lery batteries, operated against a reinforced threat tank division in an assumed first battle of the next war. The covering force slice had a frontage of 18 kilometers and available depth of 18 to 35 kilometers. The purpose of the study was to determine whether or not a covering force could fight with intensity sufficient to convince the enemy that he could not succeed in his offensive with anything less than a mass breakthrough attack. If the generals and colonels are to succeed in defeating the enemy offensive in the main battle area, they must know where the enemy is massed and they must position forces to meet and destroy that mass.

The enemy commenced his attack approximately one hour before daylight with a 25-minute artillery preparation by more than 300 tubes. The effect of that fire, even on covering force units dispersed by platoon in scattered battle positions, was very severe, especially on lightly armored and support vehicles. The enemy ground attack followed immediately thereafter, as artillery fires slackened somewhat and became more selective. In spite of the adverse odds (1 to 5 initially), by 30 minutes after daylight, the covering force had reduced the enemy division by 55 percent. The division commander had but two choices: he could continue the attack, in which case the division would be *totally* destroyed, or he could halt and defend. Neither choice accomplished the mission. The higher commander would be compelled to commit fresh divisions, and to commit them in mass if he were to conform to the timetable of a 30- to 50-kilometer advance the first day.

We Can Defend Successfully

Now some raw data from that study and some conclusions. For a member of the covering force, the first battle of the next war may last 1 hour. Even counting enemy artillery preparation time, the battle may be of only about 90 minutes duration. In the *Hunfeld II* study, supporting U.S. artillery fired about 15 percent of its basic load in that 90 minutes. The average tank fired only four rounds, but the average is meaningless. The most active tank fired 15 rounds, almost 25 percent of his on-board load. Among tank platoons, the unanimous choice of ammunition was APDS. Tankers fired this exclusively, at all ranges. Among cavalry platoons, the choice of ammunition was missile over conventional in a ratio of 4 to 3 (a choice driven by engagement range, with 1,200 meters as the

crossover to the missile). A comparison of effectiveness of *M-60A1*-equipped tank platoons and *Sheridan*-equipped cavalry platoons tells us that — in European terrain against a tank threat — an accurate, rapid-firing conventional gun is better than an accurate, slower-firing missile system. Since tanks survive enemy artillery fire better than *Sheridans*, indications are that the proposed cavalry platoon of main battle tanks and ARSV's will do even better in this defense than does the current cavalry platoon. The average U.S. platoon moved twice in the 1 hour of fighting, and moved a distance of 2½ kilometers; each time not to the rear, but laterally. Again, some platoons did not move at all, some moved three and four times. The average platoon spent about 15 percent of the battle relocating to new positions or counterattacking.

Summary of Engagements

Fifty engagements of one type or another were examined in detail. Here is the summary of type of engagements.

Artillery only	12
Artillery and maneuver units	22
Maneuver units only	11
Mines only	5

Maneuver platoons were involved in 33 engagements. Of these, less than half involved more than one platoon. This is an indicator of the speed of the battle, since commanders often could not move quickly enough from one fight to the next to insure the presence of more than one platoon. It also indicated that a platoon can ambush a battalion, and as you will see in a moment, can inflict great damage while suffering little.

Of the 50 total engagements, 32 were in or near preplanned target areas, or a planning accuracy of 64 percent.

As for engagement ranges, the average range for all weapons was 1,200 meters: for *M-60A1* tanks firing APDS, 1,130 meters; for *Sheridans* firing missiles, 1,560 meters, firing conventional, 660 meters. In considering these ranges, remember the meaning of "average" and that this was Hunfeld-Fulda terrain.

We found that of 36 artillery fire requests made during maneuver, 20 (or 55 percent) were made by

platoon leaders rather than by forward observers, and the disparity was increasing steadily. Now for the bottom lines.

U.S. LOSSES

Vehicle	Artillery	Direct Fire	Total Losses
M-551	36	11	47
M-113	22	6	28
M-60A1	6	2	8
	—	—	—
	64	19	83

One message is clear. Of the 83 U.S. vehicles lost, 64 were lost to artillery fire. Sixty were lost during the enemy's initial preparatory fires. Few vehicles, weapons, or men were lost to direct fire since proper use of the techniques described earlier denies the enemy the opportunity to shoot back at anything.

ENEMY LOSSES

Vehicle	Artillery	Direct Fire	Mines	Total
Tank	7	177	15	199
BMP	47	31	0	78
ZSU	8	7	0	15
BRDM	3	1	0	4
AVLB	1	0	0	1
	—	—	—	—
	66	216	15	297



The Russian T-62 tank must not be underestimated; it has the capability to destroy you on the battlefield.

That is the consensus of 12 members of the U.S. Army Armor School's Tank Demonstration Platoon who conducted a limited operational test of the T-62 during May and June 1975 at Aberdeen Proving Ground, MD.

As reflected above, enemy tanks were priority targets for our direct fire systems. Lighter vehicles were much more vulnerable to the artillery fire which covered relocation of friendly units. Finally, the exchange ratios.

LOSS RATIOS (BLUE VS RED)

Direct Fire	1 to 11.4	Overall	1 to 3.58
Artillery	1 to 1.02	Blue Hit (percent)	56.8

As indicated earlier, we did not do well during the enemy prep. Thereafter, in direct fire exchange, we did very well. It was as a result of the 1 to 11 exchange that, by the end of 1 hour, we had compensated for the 60 to 0 situation inflicted on us by artillery, and were making the overall exchange ratio more and more favorable (1 to 3.5 and rising).

The overall conclusion was: Yes, the covering force can do the job. It can defeat an enemy or series of enemy forces which outnumber it. The simple mathematical fact is: If we are outnumbered 1 to 5, we must have exchange ratios that are higher, or we lose. We cannot spend a tank, or an attack helicopter, or a TOW system, and get only three or four of the enemy in return. This defense, and the techniques that go with it, when properly planned and properly executed, do permit us to defend outnumbered, and win.

1975 ANNUAL ARMOR CONFERENCE

T-62 BRIEFING

First Lieutenant Michael W. Ryan
Former Tank Demonstration Platoon Leader

During the test, the Fort Knox tankers, under the leadership of First Lieutenant Michael W. Ryan, were concerned with determining the T-62's capabilities and characteristics.

Some of the results of the test were detailed by 1LT Ryan in a comprehensive briefing presented to those attending the Annual Armor Conference and the 86th Meeting of the U.S. Armor Association.



Among the features, capabilities, and characteristics described, were:

- The two separate searchlights, one for the tank commander and one for the gunner. These searchlights have infrared capability only.
- An automatic ejection system that is designed so that the expended main gun round is flipped out of the turret through a door located in the rear.
- The automatic movement of the main gun to maximum elevation after a round is fired to permit the automatic ejector to function. This movement also serves as a safety feature for the loader because the gunner cannot traverse the gun while it is in maximum elevation.
- The blower fan located underneath the vehicle which produces a rooster tail effect in the dust cloud trailing the vehicle, resulting in a distinctive recognition feature of the tank.
- The longer, heavier ammunition used in the T-62 that must be loaded left-handed resulting in an average loading time of 7 seconds.
- A Christie suspension system that, although noisy, provides a smooth ride over moderately rough terrain.

- A smoke screen capability that is provided by injecting diesel fuel directly into the exhaust manifold on the left side of the vehicle.

- A stadia sight that uses the height of the target to measure range rather than the width of the target as is the case with stadia sights on U.S. equipment.

- The headrest on the gunner's sight which wraps around the head, enabling the gunner to consistently maintain a good sight picture.

The general characteristics of the T-62 displayed during the Armor Conference are:

Weight:	40 tons
Armament:	115-mm smoothbore main gun using fin-stabilized rounds. 12.7-mm machinegun mounted at the loader's hatch 7.62-mm coax machinegun
Ammunition:	40 rounds main gun 2,000 rounds 7.62-mm machinegun
Engine:	V-12, 700 h.p., diesel
Speed:	34 m.p.h.
Range:	290 miles



1975 ANNUAL ARMOR CONFERENCE

TOWARD BETTER TRAINING

Lieutenant General Robert M. Shoemaker
Commander, III Corps and Fort Hood

These are exciting times to be in the Army. These are exciting times to be alive, and the last year or two in the Army have just been the most exciting of my 30 years. Because we're doing things—we're training better, we're thinking, we're really trying to figure out who the hell this guy is we might have to fight, and what we've got to learn to do to whip him. You've got a lot of that today. I'm not going to repeat Donn Starry's great speech and all the wonderful things that followed. But I don't think you can sit where we all were today, and listen to all of that and not really get excited about it. Now, I'd like to tell you that I agree with everything that was said today, but I don't. I agree with the thrust of everything that was said today, and that's what really makes it exciting. Everybody we heard make a pitch wants to win. Well, I want to win, and the great thing is it's really almost a revolution.

Some of you officers who've retired more than 2 years ago don't really understand—and I'm absolutely serious now—what's really going on in the Army. We now have doctrine. We have doctrine and manuals that I can understand about how squads, platoons, and companies should win this fight. And more importantly, squad leaders, tank commanders, and platoon leaders can understand them, and we can get out and work on it. You saw a little bit of this today. Our training is better than it ever has been, but not uniformly good because we don't have all of our officer, non-coms, and, I regret to say, our generals, trained as well as they have to be to win on this field. But there's a dynamism that I can feel where I am at Fort Hood, and I can feel a hell of a lot of things at Fort Hood because half of the armored divisions the Army has are there. We have 48,000 uniformed troops who have a little over 60,000 family members. We have 8,000 civilians. I keep reminding these guys, if just 1 per-

cent of our troops are giving us hell tonight, that's 500 of them running amuck at Fort Hood while we're here, and if it's only 1/10 of 1 percent, there's only 50 guys that you have to worry about when you get back there. So, we have a lot of them.

But we have other things at Fort Hood. We have an opportunity to try to figure out how to put a lot of things together. We just received a little of it today. There were a lot of things that people wanted to tell us that they just didn't have time to do. We intended to concentrate—we all got turned on by Bob Baer—we're all excited at the prospect of what the *XM-1* is really going to be, *and are we really going to get it this time?* Well, we all hope so. I think it was very clear from what many people said this morning. I really think we're going to get a great tank, and I'm going to do everything I can to help get it because we desperately need it. The thing that I think we have to recognize is that while we get it, it's just very possible that those other guys are going to do something to have something better than that *T-62* we looked at today. So whatever we come up with in the *XM-1*, I think we'd better recognize and expect that the other fellow is going to come up with something as an improvement on his tanks, and I hope to hell ours is better in all respects. But even though I really appreciate that confident report we got from Bob, I suspect that the tank on the other side may have some things that maybe aren't quite as good as ours, but they may have one or two things a little better. The difference is not going to be made up in the tank. Hopefully, we'll get an edge, but that's not going to do it. That's not going to give us the 5 to 1, or 10 to 1 exchange ratio that Donn Starry told us we're going to have to get—and we are going to have to get it. He told us exactly what's going to make the difference. It's the training; it's putting it all together;

and it's the people. That's what we're going to do. And there are a lot of things in addition to tanks that we've really got to think about, understand, and train for. *Train*—that's the area in which the Army is doing the poorest today—really getting out and seriously training. Donn showed the slide up there—all those g-- d---- things like worrying about VD and AWOL; they're important, but one way to solve those problems is to get your unit out and teach them to do their job. Teach them to win on the battlefield.

There are some things, I think, we've got to understand along with gadgets. The Army gave up on motorbikes in 1942. Well, we've got a new kind of bike today. We heard about the Armored Cavalry Platoon today, and I think it's really great for the security portion of the recon and security mission of cavalry. But if you think that there's a role there for scouts, that maybe they have to use stealth instead of brute force, I think that there's a real application for motorbikes. We've been working with them for 3 years at Fort Hood and a lot of



Motorbike testing at Fort Hood over the past 3 years indicates that there is a role for them in the security aspect of the cavalry mission.

us think that there's a role. Well, I'm just telling you guys who remember the old Harley that five men couldn't pick up, and that used to kill people as they tried to run down through to deliver dispatches to the general, there's a new kind of bike. The Japanese make them and maybe we can learn to make them. They weigh 200 pounds and can get a trooper with a binocular or a spotting scope, and another guy with a night vision device to the top of a hill where they can really do some scouting. So take a look at that while you're doing other things.

Don't forget those guys who make up half the fighters in an armored division—the old infantrymen. I didn't hear a lot about them today and this probably isn't the forum to hear about them. I didn't hear enough about what we want that guy with the rifle to do on the battlefield, and I hope to hell it's something more than get canned up in a thing and shoot out the firing ports. I'm serious, I think we've really got to know what we want that infantryman to do. The most heartening thing I've heard about the enemy today is that they don't walk. Everybody's target acquisition devices and guns are optimized to hit things that are big, heavy, hot, moving, noisy, and radiating electrons—that's the target that our kinetic energy rounds, our main guns, our *TOW* missiles, and our *Dragons* are designed to hit. Let's make sure that we cover all the bets, just in case that guy doesn't do what they said today, and shoulders his rifle, walks through the woods, and beats us over the head as we get up for stand-to some morning. We'd better not forget it, he's got a lot of folks.

There are some other things—we've been playing around with helicopters in the Army for many years, and everybody in this room knows we're not going to use them on the kind of battlefield we're talking about the way we used them in Vietnam. But there are damn few people in the Army anywhere that are really training to use them the way we think we ought to use them on this battlefield. At Fort Hood, I've got a rule that nothing leaves the motorpool or goes out in the range that isn't tactical all the way—there's no such thing as administrative training. You're out there and you're playing the game. Well, it's also true of helicopters and if we did that, I think we could begin to understand a little bit better what we might want them to do, and the tactics we want them to follow. To me, it's simple as hell—you can put your *TOW* missile on that thing that we saw today and with the 2-shot job—which I'm all for, and I commend Donn Starry and his peo-

ple for inventing it and the thrust to push that thing—but what you do when you put a bunch of those on a helicopter, about 8, is that you just put them on a vehicle that has speed and agility. The kind that can jump up and hop over trees, hop over the ford, climb the mountain, and do those kind of things. It can also shoot for V Corps this morning, and VII Corps this afternoon. But it can't do lots of other things, you've got to pay for the speed and agility. Well, what we've got to have is an army that can use something like that, I believe, to handle its 50 clicks where we're not massing our 8 battalions to meet the thrust, and to work with that covering force out there to maybe help give the clue to those smart generals—that I hope to hell somebody's training somewhere—that'll concentrate the forces where we need them to go. There are just an awful lot of uses for the helicopter—I happen to think, because at Fort Hood we've had the mission of working with them for 3 or 4 years—I believe they can be useful. But it doesn't make any difference what I believe; the only thing that's important is if the Army believes and trains. Good doctrine doesn't get you anywhere—good doctrine and good training will help a hell of a lot. It's just like knowing about the enemy—knowing about the enemy doesn't affect the battle. The only thing that affects the battle are orders to your own folks.

I'm suggesting that we've heard a lot of good talk today, but the best thing that it can do is to energize us to go back home whether you're retired, active, civilian, or whatever, and really get with the program. At Fort Hood, we have two of our four armored divisions, the Army's only air cavalry combat brigade, a Corps support command that supports the whole thing, and a reservation of 341 square miles of the best maneuver area that I know of in the United States; a good impact area, and Rick Brown, whom you people voted to your executive council today, is the only brigade commander I know of in the Army who can work with all these damn things we've got. Our problem today is to teach company, battalion, and brigade commanders to understand how you lash together and whip the enemy by using a *Dragon*, ground *TOW*, *TOW* on a helicopter, tanks with guns, tanks with missiles, *Sheridans*, and all these kind of things. Rick Brown is the only brigade commander in the United States—in CONUS anyway—who has an *M-60A2* battalion in his brigade, and he happens to be at a post where he can be supported by a pack of helicopters from

the air cavalry combat brigade down there. That's what everybody in the Army has to know and we have to teach people to lash this together.

It's not simply you and I agreeing that "Yes, all these things can contribute," but it's getting down and teaching our troops. I hate to take off on Donn's speech, but he said it all. He stole everything this morning that I could say tonight. When he showed those slides about the 20 things that you've got to do, and the one thing that we have to do—*Train*—and the 20 things that keep us from doing it. That's our problem. There's only one really important thing that I'm proud of and I'm trying to do it at Fort Hood. I don't know whether it's going to succeed, but I've got my Major General deputy and a Brigadier General that I borrowed, and Brigadier Deputy Commanders, and I tell them, you take as many months as it takes to strip out all the junk that we're doing, the burdens of administration, and I think we can cut out 75 percent of the work that we're doing that's keeping our company commanders, executive officers, and first sergeants from going out and training their troops. We're going to establish a common philosophy at Fort Hood—how we do things and what kind of reports that people don't need at battalion, brigade, and division levels, and at Corps level—and we're really going to try like hell to cut out all the nonessentials and really get down to serious training. That's what it takes.

My final point—people are always asking "What about this Volunteer Army; what about the people we're hiring off the corner drugstore and off the street today?" They're good people. Statistically, they're better than we've ever had. But the values of America are changing and they're changing rapidly. While they're good people and they're ready to learn, they require better leadership than our Army has ever had to produce. A poor leader can't cut it today; he's challenged every single day and he's not going to make it. These troops will fight and they'll fight well if they have good leadership. They're not going to fight for a sergeant who just has stripes on here, or a lieutenant with bars on here; they'll fight for those people if they're leaders, but not because they're lieutenants or sergeants. That's one hell of a shock. As little as 10 years ago, if the lieutenant said so, people did it. They'll still do it if the lieutenant's a leader and if we've taught him to do the things we want him to do. That's the difference we've got to recognize. You've got to prove yourself and you've got to do the job.

US Armor Association-1975



President

Major General John K. Boles Jr. (USA-Retired) was commissioned in Cavalry from the US Military Academy in 1939 and was assigned to the 7th Cavalry, 1st Cavalry Division at Fort Bliss. He later transferred to the 1st Cavalry Regiment, 7th Cavalry Brigade (Mechanized) which became the 1st Armored Division (Old Ironsides).

During World War II, General Boles was assigned as a tank battalion commander and Regimental Executive Officer of the 32d Armored Regiment, 3d Armored Division. He returned from Europe with the 2d Armored Division and served with it for two years. Following three years of service in Vietnam, General Boles became Commander of the 6th Armored Cavalry Regiment.

For two years prior to his retirement in 1971, General Boles was Commander of the 1st Armored Division at Fort Hood.



Vice President

Major General James L. Moreland received his commission through OCS in 1942 after two years' enlisted service with the 142d Infantry Regiment, 36th Infantry Division of the Texas Army National Guard. During World War II, he served in both the European and Pacific Theaters as a platoon leader and as a company commander with the 343d Infantry Regiment, 86th Infantry Division until his release from active service in 1946.

General Moreland rejoined the 36th Infantry Division, Texas ARNG in 1949, commanding at battle group, battalion and brigade levels. In 1968 he became Deputy Commander, then Commander of the Arrowhead Emergency Operations Headquarters. Following this, he was assigned as Deputy Commander of the 72d Separate Infantry (Mechanized) and was later named Brigade Commander.

On 1 November 1973 he assumed command of the 49th "Lone Star" Armored Division.

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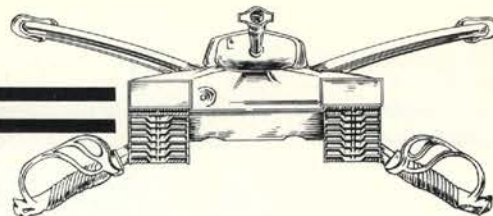
Armor Association Sabers



Armor Association sabers were presented to two distinguished cadets from the Class of 1975 during ceremonies at the United States Military Academy on 3 June 1975. Commandant of Cadets, Brigadier General Walter F. Ulmer, Jr. made the presentations on behalf of the Armor Association.



Lieutenant William Venema (left) received the award for standing highest in General Order of Merit. After completing Armor Officer Basic, the Organizational Maintenance Officer Course, and Ranger School, he will serve with the 2d Armored Cavalry Regiment in Germany. Lieutenant William J. Blankmeyer received his award for demonstrated leadership ability. He will serve with the 1st Armored Division, Germany, following Armor Officer Basic and the Organizational Maintenance Officer Course.



OPMS

The Officer Personnel Management System (OPMS) has moved from its planning stage to a fully operational system for the management of officer professional development and utilization. The designation of two specialties for all lieutenant colonels, majors, and captains with over 7 years active federal commissioned service was completed prior to 15 July 1975. By 30 July, all captains and lieutenants with less than seven years service had been designated a basic entry specialty. Through Project EASI (Expanded Use of Specialty Skill Identifier) the Army's officer personnel requirements have been defined in terms of specialty skills. For the first time the Army has common definitions for job requirements and officer qualifications in terms of skills. This permits personnel managers to evaluate specialty overages and shortfalls and to manage toward the future rather than in response to the past. Starting 1 November 1975 officers will be requisitioned and assigned by specialty and grade rather than branch and grade.

CENTRALIZED COMMAND SELECTION SYSTEM

The Army's Centralized Command Selection System is designed to select those officers best qualified to command designated units/organizations at brigade and battalion level. To date, approximately 525 colonels and 700 lieutenant colonels have been selected by HQDA Command Selection Boards to fill a variety of designated command and management positions. Pertinent statistics concerning the LTC's; MAJ's(P) selected for 683 battalion level command positions by the last Board are:

Number Eligible	5,631
Number Submitted to Phase II Selection Board	2,386
Number Rank Ordered	1,311
Number of Principals	683
Number of Lieutenant Colonels	390 (57.7%)
Number of Promotable Majors	293 (42.3%)
Number of OTRA Officers	8 (1.2%)
Number of Non-CGSC level Graduates	20 (2.9%)
Number of Officers Non Select to COL (AUS)	4 (0.6%)

The board to select lieutenant colonels and majors(P) to commence their command assignments between 1 October 1976 and 30 September 1977 is expected to meet in January 1976 with results anticipated for publication in May 1976.

UNDERGRADUATE DEGREE COMPLETION PROGRAM

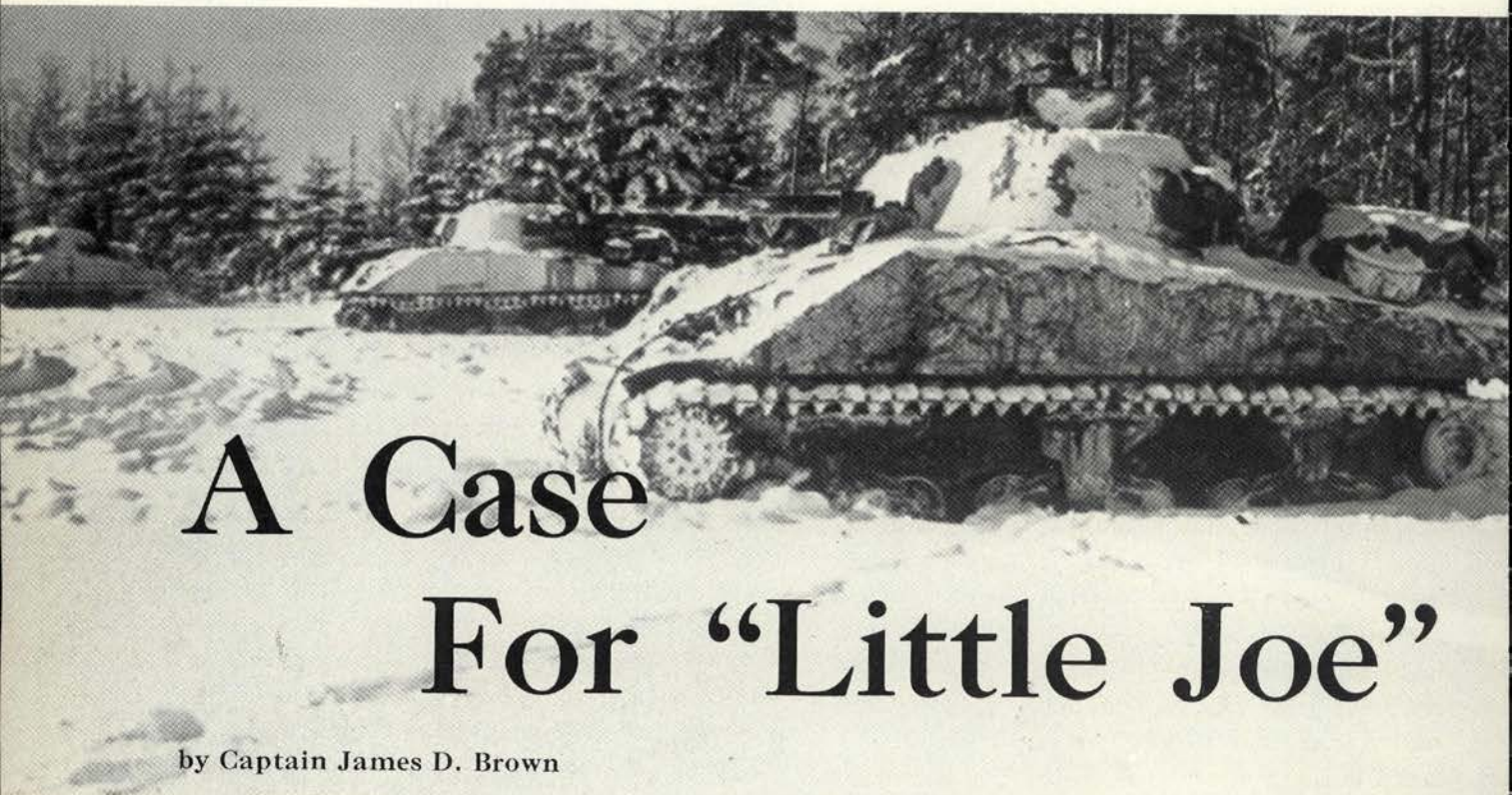
If you have been reading *Army Times* recently, you are aware that the Degree Completion Program (DCP) is currently undergoing close Congressional scrutiny. Whether we will have the program next year or not is still indefinite; however, here is what we know to date:

- The House already voted to eliminate new inputs into the Undergraduate Degree Completion Program for officers effective 30 September 1976. Additionally, they proposed a \$16-million reduction in PCS funds.
- The Senate was scheduled to vote on the subject in October.
- The Army has provided a reclama position to the Senate Appropriations Committee recommending the continuation of the program.

Whatever the final outcome, it is likely that there will be some major revisions in the DCP and our officers should be getting prepared. Here is what we recommend:

- If you will have 30 months at your current duty station by 30 September 1976, and if you have graduated from, or are enroute to the advanced course, contact CPT Sharp at Autovon 221-7818/7819, to discuss the possibility of attending school before 30 Sep 76. Eighteen months is the maximum time you will be allowed, and the length of the PCS move will be a major factor, i.e., those eligible to complete their degree without a PCS will be given priority.
- If you do not meet the 30 months on station requirement, you should make plans to complete your degree at your current duty station. This may become a requirement with a reduction in PCS funds.

This is the first of a series of articles on DCP. We will provide you with the latest information as it becomes available to us. □



A Case For “Little Joe”

by Captain James D. Brown

Good evening, Sir. You look a little cold.

Good evening, Top. I sure am. Any coffee or soup left?

Here's some coffee, Sir. How did the perimeter look?

Real good. I was particularly pleased with the sleeping hooches made by the tank crews. On a night as cold as this, they'll need to stay warm in order to get any sleep. Noise discipline was good, too; with no wind, any noise would carry all the way down to the valley. Anybody come looking for me while I've been gone?

They sure did, Sir! As a matter of fact, there were so many I had to start writing them down. To begin with, a messenger came by from battalion with word that we should be prepared to move at 0530 sharp. He also relayed from S-2 that still-air temperature tonight will be at 5° below zero, with no wind or snow expected. The first platoon leader also reported that his people are having problems because their breath is condensing and freezing on the sights. He says that unless he gets some tank

heaters fired up, he will not be able to cover traffic at the crossroads. The commo sergeant was in to say he'll work on those cables in 33 and 42 all night if need be, but that progress was slow because he could only take his gloves off for a little while before his hands got cold again. Second Platoon has been busy conducting that IR surveillance of the town down in the valley, but they say that in this cold weather their batteries won't hold up long. They will either have to crank tonight and blow our noise discipline, or take a chance on dead batteries by morning. The battalion XO was also in about 15 minutes ago, and, based on our experience of having to slave eight tanks this morning, he recommends we crank up periodically tonight so we can make that 0530 move. He said the other companies are having the same problems. Other than that, it's been peaceful as a tomb around here. Care for a refill on that coffee, Sir?

At this point, the company commander is faced with a complex problem. Should he authorize his crews to crank up tonight and risk divulging the

company's position? Should he move stand-to up in order to insure that every tank can be started in time for the 0530 move? Should he shut down the IR surveillance program to save the second platoon's battery power and thus risk the town's being occupied unnoticed during the night? Should he have the first platoon crank up or should he take the risk of having those frosted sights allow enemy traffic through the crossroads unobserved? About the only easy decision he can make right now is the one about the coffee.

Yeah, Top, I'd better have a refill; it looks like I'm gonna be up a little later than I thought. I don't think we can make it until morning without cranking up at least once. I hate to do it, though; we may as well send up star clusters to advertise our presence. You know, Top, I guess it's generally understood that a '60 won't make it through a cold night on batteries alone. We used to discuss the problem during coffee breaks at the Armor School. We usually concluded that an extension cord long enough to reach back to battalion maintenance would do it. It was all pretty academic then. It's amazing to me how much more relevant the problem becomes when you're sitting out here among 17 tanks and 80 men, all of whom are freezing their respective butts off atop this hill. Cold weather really clears your thought process. You were a tanker in Korea, weren't you, Top? You must have seen cold weather problems like these before.

Yes, Sir, I was a bow gunner on an "Easy Eight" through two winters in Korea. The cold caused the same problems then that it does now. The best thing we had going for us then was a little gas engine-generator set which could provide the tank's power requirements when the main engine was shut off. Nowadays, they'd call it an auxiliary power unit, or some such fancy name, but we just called it *Little Joe*. (Note. The M-41, 46, 47 and 48A1

and 2 were also equipped with a *Little Joe*. — Ed.) We needed it mostly because the Easy Eight's gas engine ate up fuel so fast, but it helped in lots of other ways, too. My TC put me in charge of *Little Joe*, as well as the bow gun, and told me that, considering the bitter cold of those Korean winters and the human wave tactics of the North Koreans, he figured as how I had the two most important pieces of equipment on the tank. He said that if either one quit when we needed it most, I wasn't to worry none about making corporal.

Now *Little Joe* wasn't perfect, Sir; he took a lot of maintenance and drank a lot of fuel for his size, but at least you could be reasonably sure that you could sit out a cold night on the line and still get her started in the morning. You know, a modernized *Little Joe* could be put into a '60 without much trouble. Take a small engine, maybe no bigger than a chain saw, and hook it to a generator. It wouldn't have to be big enough to power the tank subsystems



M-4 "Easy Eight"



Little Joe would facilitate crew comfort and operational readiness in cold weather.

M-41

"In hot weather . . . that turbine would even power an air conditioner."

directly, just enough to keep the batteries up. There's room for one above either fuel cell, or it could even go atop the transmission heat shield. A muffler shouldn't be much of a problem; you could even dump the exhaust gases into the engine compartment where they would help keep the engine warm. You would probably have to carry Mogas for it, but a 5-gallon can ought to get you through the night and would be a small price to pay. A rig like that shouldn't cost much, say not much more than the cost of a chain saw plus the cost of a standard 28-volt Jeep alternator and rectifier. With it, you could run not only your heater and interior lights, but radio, fire control, and even turret power all night and still crank up in the morning with a lot less fuss than it takes now.

Top, I think you just reinvented the wheel. I don't see why a kit couldn't be developed for addition to existing vehicles. Listening to you has reminded me of an idea I had as a lieutenant, but never did fully develop. It's probably easier to design into a new tank, but could be retrofitted into the M-60-series as a kit. I was thinking about replacing the tank heater with a small turbine engine. The heat from the turbine would be more than sufficient to heat the crew compartment and still keep the engine warm enough to facilitate cold weather starting. The engine compartment would also diffuse the hot exhaust gases, and thereby reduce the signature which the tank heater now presents to thermal imaging systems. Mechanical output from such an engine could provide electrical energy for operation of the tank when the main power plant was shut down. Thermal energy or electricity would also be available for producing hot water for washing or cooking. With the increased battlefield dispersion we will probably be practicing in the future, the tank crews will have to depend more and more on themselves for personal maintenance in the field. The immersion heater we always set up in the chow line for shaving water may not be so close at hand in a future combat situation. In hot weather, and I know this is really Buck Rogers stuff, Top, that turbine would even power an air-

conditioner. I've often wondered how long you could fight buttoned-up in the desert.

I'll tell you one thing, Sir, you get an air conditioner into a tank and you could start meeting those reenlistment goals with "no sweat," if you'll pardon the expression. One hang-up, though; how much is this going to cost? You multiply the cost of your idea, or even mine, times all the tanks in the inventory and you'd have a whopping bill.

Well, Top, I don't think every tank needs such a modification. We could issue them as kits to selected units, with issue priority determined by the unit's equipment, mission, geographic location, or expected wartime disposition. For example, a unit in Germany may not need air-conditioned tanks, but does need the capability to keep men and machines warm when not on the move. On the other hand, a unit in a hot climate has no worries about engine oil congealing, but could use that air conditioning to protect fire controls (particularly electronic fire control and commo gear) and to maintain crew efficiency. Units deployed in moderate climates wouldn't need the modification, and tanks assigned to the training base would only have enough of them to familiarize crews and maintenance personnel. The Guard and Reserve outfits wouldn't require them during peacetime; when needed, the necessary modifications could be made during their mobilization period. But enough of this dreaming of *Little Joe*. That extension cord back to battalion maintenance will probably be as close as we get to any solution, at least as long as there are coffee breaks at the Armor School. Ask the radio watch to wake me at 0100, and pass the word to be prepared to crank for 30 minutes, starting at 0130. Stand to at 0445, feed half at a time starting at 0500, move at 0530. Hope it's not as cold tomorrow night. Good night, Top.

Good night, Sir.



CPT JAMES D. BROWN was commissioned as a Distinguished Military Graduate of the University of Santa Clara. He has served as platoon leader, executive officer, and commander of TOE and TDA tank units in CONUS and Europe, and as advisor with IV Corps in Vietnam. Captain Brown is currently attending the Armor Officer Advanced Course.



No More "New" Lamps For Old Ones!

A recent article in *ARMY* magazine which proposes a return to the regiment as the core control and sustaining element of the Army's combat forces, ("Revive the Regiment, Rotate, Reorganize" by Captain Sinnreich and Colonel Osborn, May 1975) attracted my attention because it focused on a malady that has concerned me for some time. This malady is what I would term "reorganizitis," and its consequences are pronounced discontinuities. It stems from an apparent insatiable desire to keep the Army in a near-constant state of reorganization. Since the end of World War II, there hardly has been an appreciable period in which the Army has not been entangled in one reorganization morass or another. Trying to keep track of them is as frustrating as attempting to count the sequins on the jacket of a whirling dervish. Evidently, there is a widespread belief in the Pentagon that progress is reorganization, and that reorganization is the panacea to all problems. Nearly every new formulation

is accompanied by extensive fanfare attesting to the great cost savings or cost-effectiveness that will be achieved.

According to Peter Drucker, well-known management consultant, teacher and author, many corporations also are in the throes of reorganizations. As a sharp contrast with American Telephone & Telegraph, General Motors, DuPont, and Sears, Roebuck — whose organizations have stood for decades without needing more than an occasional touching up — Drucker cites the recent experiences of General Electric, IBM, Imperial Chemicals in Great Britain, and large commercial banks in the U.S., who have been engaged in major revamping and restructuring of their organizations. He notes: "For instance, the Health, Education and Welfare Department has been subjected to a 'final' reorganization almost every year in its 20-year history . . . Companies are resorting to reorganization as a kind of miracle drug in lieu of diagnosing their ailments. Every business

observer can see dozens of cases where substantial, even massive, organization surgery is being misapplied to take care of a fairly minor procedural problem, or — even more often — to avoid facing up to personnel decisions. Equally common is the misuse of reorganization as a substitute for hard thinking on objectives, strategies, and priorities. Few managers seem to recognize that the right organization structure does not guarantee performance, but rather is a prerequisite of performance. The wrong structure is indeed a guarantee of non-performance; it produces friction and frustration, puts the spotlight on the wrong issues, and makes mountains out of trivia."

To one versed in organization theory, such fascination with this "reorganizitis" seems akin to the belief of Alladin's bride that it was to her advantage to trade an old lamp for a glittering new one as proposed by the villain disguised as a harmless merchant. Unfortunately for her, with Alladin away on a trip, she did not recognize that the old but serviceable lamp was the magic one to whom the miracle-making Genie responded. But the new one looked so irresistable attractive! And so she traded . . .

Based on the perpetual turmoil created by the Army's continual experimentation with reorganization since World War II, the Army has been making such trades for years. The violence that continuing reorganizations do to the essential bonds with the past probably are incalculable. Students and scholars of organization theory and motivation tell us that a principal role of the leader is to develop an effective *identification* with the organization and its goals by all its members. Only in this way, we are informed, can there develop effective teamwork or disciplined unity of effort *committed* to achieve what becomes a *common* goal. But with one reorganization superimposed on the one before, how can one have the chance to "identify" with an organization that vanishes almost before it can be recognized? Almost like a perpetual TV game of "What's My Line?," we struggle endlessly to learn who is re-

sponsible for what, and where the locus of the action is supposed to be located. Missions and men shuttle around bewilderingly, trying to find a "seat" that will accommodate them by the time the orchestration stops.

While the bulk of the Army's organizational realignments have been predicated on a desire to keep pace with ever-changing technological advances, involving more sophisticated and costly military hardware and computerized information and control systems, these changes frequently have violated fundamental organizational principles. Authorities, responsibilities, relationships, procedures, systems and the like, have not been simplified, refined or clarified to the extent needed. Consequently, ill-conceived realignments — many born out of expediency and forged by compromise — have induced a painful and pernicious instability. With few clearly recognizable threads of continuity from one major change to the next, these developments have introduced new confusions and redundancies.

In effect, we have lost our "identities." In this sense, I believe the return-to-the regiment concept merits careful study. It appears to possess an encouraging stimulus to help resolve the identity problems by minimizing the pronounced discontinuities that have so characterized practically all major Army organizational changes in the past 30 years, and especially since 1962 when the Army Materiel Command was formed. Combat and combat support troops are covered in some detail in the referenced article. The combat service support elements, however, received scant attention; obviously more extensive treatment is needed. The logistics base, such as represented by the Army Materiel Command, will require special assessment. In any event, when it comes time to make critical decisions on Army organization, let us not become blinded by the apparent glitter of some of those "new" lamps!

— Dr. George G. Eddy, Jr.
Management Consultant

COMMEMORATIVE DRAWING



The prizes shown above were awarded to members of the U.S. Armor Association during the commemorative drawing held at the Association's 86th annual meeting at Fort Knox, KY, 17-19 September 1975. Each member of the Association earned one chance for the prizes for each new member he recruited. The first prize, a Model 1866 Winchester, was won by Captain Theodore R. Blasche, Department of Military Science, University of Wisconsin; Lieutenant

Colonel John K. Owens (AUS-Retired), Radcliff, KY, received the Robert E. Lee commemorative .36 caliber Colt cap and ball pistol; Captain George J. Balco (USAR-Retired), Coscob, CT, was the winner of the saber; Captain Robert J. Frisch, Whitefish Bay, WI, got the Bowie knife; and a 3-year subscription to *ARMOR* went to Colonel Albert L. Hutson (USA-Retired), San Francisco, CA. The drawing honored the 90th anniversary of the Association.

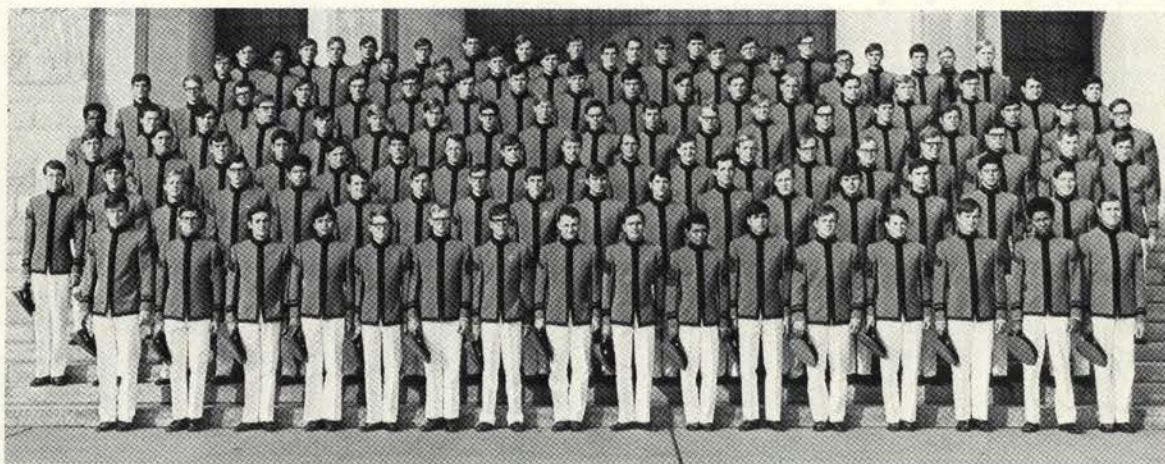
CHANGES IN CONSTITUTION

The general membership of the U.S. Armor Association voted two changes to its Constitution at the 18 September 1975 meeting. One change was the authorization for interested members numbering 25 or more to form local chapters under the articles and by-laws of the national association. Applications for chapters can be obtained through the Secretary-Treasurer.

Another change was the addition of a "non-voting associate member" category. This opens membership to individuals who have no prior military service, but are distinguished members of industry or the professions. **Applications for non-voting associate membership must be made by letter to the Secretary-Treasurer, U.S. Armor Association, P.O. Box 0, Fort Knox, KY 40121.**

□

ARMOR GRADUATES, CLASS OF 1975 UNITED STATES MILITARY ACADEMY



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3rd Row: Gerberman, Ellis, Bice, Omlie, Wells, Davis, Thomas, Fitzgerald, Edwards, Johnson, Quirk, Mitcham, Heinen, Everett, Tellier, Hehmeyer, McConnell, Tharp.
4th Row: Johnson, Acevedo, DiDomenico, McNulty, Brooks, Richardson, Venema, Heredia, Huey, Ratz, Renne, Peterson, Wallace, Samson, Garver, Hansen Scace, Meisell, Berlin.
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7th Row: Clark, Ward, Gulden, Wittman, Blankmeyer, Groves, Redington, Showers, Lute, Perle, Williams, Haas, Schumann.
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BOOKS

ARMIES IN REVOLUTION

by John Ellis. Oxford University Press. 264 pages. 1974. \$10.95.

Armies in Revolution examines the conflict between the critical need for an organized revolutionary army and the ideology that created the revolution. The author stresses the importance of social and political factors rather than military efficiency in revolutionary situations; ideology being more important than military organization. In short, war must be a crusade. Yet in the long run, military success does not result in the adoption of the original revolutionary goals because the original goals are lost when the revolutionary army adopts an organization that stifles popular attitude and aspirations.

In reaching his conclusions, the author examines the English Civil War, the American Revolution, the French Revolution, the Prussian Army Reforms, the Franco-Prussian War and the related Paris Commune, the Russian Civil War, and the Chinese Communist Revolution. Only Mao Tse Tung, leader of the Chinese Communist revolution, has been able to maintain political zeal and military cohesiveness over an extended period. Perhaps the reason for Mao's success lies in the treatment of the rural population. The author makes the point several times that the rural peasant is necessary for the success of any revolution, yet the peasant has consis-

tently been excluded. The one exception was China where the movement had to be immediately identified with the peasant because of economic security.

Mr. Ellis supports his arguments well; however, his style of writing is awkward, and in many cases, very hard to follow. He is British and a former member of the Department of Military Studies at the University of Manchester in England. Unless the reader is particularly interested in revolutionary warfare, the book is of little military value.

Colonel Carl M. Putnam
Chief, Atlanta Readiness Group

NAPOLEON'S LAST CAMPAIGN IN GERMANY-1813

by F. Loraine Petre. Hippocrene. 403 pages. 1974. \$10.00.

A defeat on the scale of that which the French suffered during the 1812 Moscow campaign would have ended the career of any man less titanic than Napoleon I. Instead of admitting that the end was near for his empire, Napoleon fielded an army of over 200,000 men in Central Germany. This army, greatly deficient in cavalry, was in a central strategic position, capable of inflicting great damage, if not decisive defeat, upon the advancing Russian and Prussian armies in the spring of 1813. And yet, within 6 months, this same

army was in full retreat toward the Rhine after suffering a decisive defeat at the Battle of Leipzig. This critical year in European history has not received the study which it truly deserves from the military and historical standpoint.

Napoleon's Last Campaign in Germany—1813, by F. Loraine Petre, is a reprint of a 1912 edition which has successfully survived 62 years without losing its relevance for the military historian. The amazing feat accomplished by Napoleon during the spring and summer of 1813 deserves praise and study. The tactical genius of Napoleon was less frequently displayed than when he was a younger man, but his strategic skill prolonged the final defense of his empire for at least 6 months. Mr. Petre describes Napoleon's lapses into lethargy during critical periods. These attacks of lethargy ultimately crippled the French military system of command, which depended upon the personal genius of Napoleon for decisive results. Mr. Petre also clearly documents the inadequacy of the marshallate (military hierarchy) when given commands or missions away from the direct supervision of the master. The inability of the marshals to command independent forces larger than a corps was a fatal weakness of the French 1813 campaign. Ney's humiliation in Northern Germany — coupled with MacDonald's defeat in Bohemia — forced the French forces into tactical and strategic defense and culminated in the Battle of Leipzig. At Leipzig, Napoleon allowed vastly superior enemy forces to concentrate on his army, and he failed to insure that adequate routes of retreat were available for his forces in the event of a defeat. Fighting on interior lines, he failed to achieve the destruction of the Allied Army, and only with great difficulty, was he able to save half of his army.

Petre's analysis of the 1813 campaign is superb. The detailed tactical information provided concerning the location and activities of units is interesting; however, the quality and location of the maps, at the end of the text, could be improved upon. This book is a valuable and interesting work for the military historian.

Captain James S. Wheeler
Armor

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